Vol. 1049 Number 2

OFFICIAL GAZETTE

of the UNITED STATES PATENT AND TRADEMARK OFFICE

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PATENT

December 11, 1984

U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

December 11, 1984 Volume 1049 Number 2

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.

GENERAL INFORMATION concerning PATENTS.

GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.00 each; PLANT PATENTS in color, $8.00 each; copies of TRADEMARKS at $1.00 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1042 O.G. 45 on May 15, 1984.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Domestic PCT fees were increased on Oct. 1, 1982 by a rule change to 37 CFR 1.445 that was published in the *Official Gazette* at 1021 O.G. 11 on Aug. 10, 1982.

The Search fee for the European Patent Office was changed as of Feb. 14, 1984 and was announced in the *Official Gazette* at 1039 O.G. 142 on Feb. 21, 1984.

International PCT fees were changed by the PCT Assembly effective Jan. 1, 1984 and were announced in the *Official Gazette* at 1037 O.G. 12 on Dec. 13, 1983.

The current schedule of PCT fees is as follows:

Transmittal fee	$ 125.00
Search fee	
U.S. Patent and Trademark Office as Searching Authority	
• No corresponding prior U.S. national application filed	500.00
• Corresponding prior U.S. national application filed	250.00
European Patent Office as Searching Authority	
• All cases	620.00
International Fees	
Basic fee (first 30 pages)	295.00
Basic Supplemental fee (for each page over 30)	6.00
Designation fee (for each national or regional office)	70.00

GERALD J. MOSSINGHOFF,
Apr. 13, 1984. *Commissioner of Patents and Trademarks.*

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), effective Nov. 1, 1984. If the maintenance fee is not paid in a patent requiring such payment, the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on Dec. 8, 1981 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Plant Patents	None
Utility Patents	4,304,005 through 4,305,159

Reissue Patents based on the above identified patents. No maintenance fees are required for design patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 200.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f))	$ 200.00
By other than a small entity	$ 400.00"

The amounts of the surcharges, effective Nov. 1, 1984, are set forth in 37 CFR 1.20(k)-(m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . $ 100.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f))	$ 50.00
By other than a small entity	$ 100.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee on a patent based on an application filed on or after Aug. 27, 1982, where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . $ 500.00"

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,350,532, Re. S.N. 653,871, Filed Sept. 21, 1984, Cl. 106/30, GLASS COMPOSITION AND ARTICLES, Ronald M. Randklev, Owner of Record: *Minnesota Mining and Manufacturing Co., St. Paul, Minn.,* Attorney or Agent: Donald M. Sell, et al., Ex. Gp.: 157

4,358,549, Re. S.N. 654,190, Filed Sept. 24, 1984, Cl. 523/117, DENTAL FILLING COMPOSITION UTILIZING ZINC-CONTAINING INORGANIC FILLER, Ronald M. Randklev, Owner of Record: *Minnesota Mining and Manufacturing Co., St. Paul, Minn.,* Attorney or Agent: Donald M. Sell, et al., Ex. Gp.: 153

4,413,737, Re. S.N. 656,142, Filed Sept. 28, 1984, Cl. 206/599, SHIPPING PALLET AND A PACKAGE FORMED THEREFROM, Joseph H. Wind, Owner of Record: *Bigelow-Sanford, Inc., Greenville, S.C.,* Attorney or Agent: Donald M. Seltzer, et al., Ex. Gp.: 241

4,433,696, Re. S.N. 656,993, Filed Oct. 2, 1984, Cl. 131/336, VARIABLE DILUTION FILTER, John M. Adams, Owner of Record: *Philip Morris, Inc., New York, N.Y.,* Attorney or Agent: Frank E. Robbins, et al., Ex. Gp.: 332

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

3,908,195, Reexam. No. 90/000,659, Requested: Nov. 1, 1984, Cl. 364/300, DIGITALLY DETERMINED VELOCITY CONTROL METHOD AND MEANS FOR A DIGITAL MOTOR SYSTEM, Albert C. Leenouts, Owner of Record: *Superior Electric Co., Bristol, Conn.*, Attorney or Agent: Mattern, Ware, et al., Ex. Gp.: 230, Requester: Owner

4,187,212, Reexam. No. 90/000,662, Requested: Nov. 5, 1984, Cl. 524/101, STABILIZATION SYSTEMS FROM TRIARYLPHOSPHITES AND PHENOLS, Horst Zinke, et al., Owner of Record: *Ciba-Geigy Corp., Ardsley, N.Y.*, Attorney or Agent: Karl F. Jorda, Ex. Gp.: 153, Requester: B. F. Goodrich Co., Akron, Ohio

4,189,079, Reexam. No. 90/000,661, Requested: Nov. 5, 1984, Cl. 226/188, CONTROLLABLE DRIVE FOR TAPE RECORDER, Zenshiro Uehara, Owner of Record: *Hashimoto Corp., Tokyo, Japan,* Attorney or Agent: Koda & Androlia, Ex. Gp.: 240, Requester: Owner

4,189,834, Reexam. No. 90/000,663, Requested: Nov. 7, 1984, Cl. 433/225, DENTAL REINFORCING PINS, Andrew J. Smith, Owner of Record: *Fairfax Dental (Ireland) Ltd., Dublin, Ireland,* Attorney or Agent: Beveridge, De Grandi & Kline, Ex. Gp.: 330, Requester: Owner

4,406,590, Reexam. No. 90/000,660, Requested: Nov. 5, 1984, Cl. 417/360, HERMETIC COMPRESSOR, Donald L. Kessler, Owner of Record: *Tecumseh Products Co., Tecumseh, Minn.*, Attorney or Agent: Gust, Irish, et al., Ex. Gp.: 343, Requester: Matsushita Refrigeration Co., Osaka, Japan

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Erratum

"All reference to Patent No. 4,476,226 to Paul E. Hansen, et al., of Minn. for 'DRY CULTURE MEDIA' appearing in the Official Gazette of Oct. 9, 1984 should be deleted since no patent was granted."

"All reference to Patent No. 4,480,167 to John H. Huys, et al., of Canada for 'WELDING ELECTRODE' appearing in the Official Gazette of Oct. 30, 1984 should be deleted since no patent was granted."

"All reference to Patent No. Re. 31,740 to Ralph F. Goucher, et al., of Calif. for 'PUSH-BUTTON CLUTCH CONTROL SYSTEM' appearing in the Official Gazette of Nov. 20, 1984 should be deleted since no patent was granted."

"All reference to Patent No. 4,482,292 to Arthur Cohn, et al., of Calif. for 'METHOD AND MEANS FOR RECAPTURING COOLANT IN A GAS TURBINE' appearing in the Official Gazette of Nov. 13, 1984 should be deleted since no patent was granted."

"All reference to Patent No. 4,482,631 to David V. Goeddel, et al., of Calif. for 'MICROBIAL EXPRESSION OF QUASI-SYNTHETIC GENES' appearing in the Official Gazette of Nov. 13, 1984 should be deleted since no patent was granted."

"All reference to Patent No. 4,485,340 to Dimitrij B. Isosimov, et al., of Yugoslavia for 'METHOD AND APPARATUS FOR THE CONTROL OF SYNCHRONOUS MOTORS' appearing in the Official Gazette of Nov. 27, 1984 should be deleted since no patent was granted."

DEPARTMENT OF THE TREASURY
U.S. CUSTOMS SERVICE

Application for Recordation of Trade Name: "THE UNION FORK AND HOE COMPANY"

Agency: U.S. Customs Service, Department of the Treasury

Action: Notice of Application for Recordation of Trade Name

Summary: Application has been filed pursuant to section 133.12, Customs Regulations (19 CFR 133.12), for the recordation under section 42 of the Act of July 5, 1946, as amended (15 U.S.C. 1124), of the trade name "THE UNION FORK AND HOE COMPANY," used by the Union Fork and Hoe Co., a corporation organized under the laws of the State of Ohio, located at 500 Dublin Ave., Columbus, Ohio 43216. The application states that the trade name is used in connection with hand-operated, farm, garden and lawn tools manufactured in the United States.

Before final action is taken on the application, consideration will be given to any relevant data, views, or arguments submitted in writing by any person in opposition to the recordation of this trade name. Notice of the action taken on the application for recordation of this trade name will be published in the Federal Register.

Date: Comments must be received on or before (60 days from date of publication).

Address: Written comments should be addressed to the Commissioner of Customs, Attention: Entry, Licensing and Restricted Merchandise Branch, 1301 Constitution Ave., NW., Washington, D.C. 20229.

For Further Information Contact: Harriet Lane, Entry, Licensing and Restricted Merchandise Branch, U.S. Customs Service, 1301 Constitution Ave., NW., Washington, D.C. 20229 (202-566-5765).

DONALD W. LEWIS,
Nov. 9, 1984. *Director, Entry Procedures and Penalties Division.*

Patent Suits

Notices under 35 U.S.C. 290: Patent Act of 1952

3,319,515, Philip A. Flournoy, INTERFEROMETRIC OPTICAL PHASE DISCRIMINATION APPARATUS, **filed** July 17, 1984, D.C., N.D. Calif. (San Francisco), Doc. C84-5002WWS, *Bio-Rad Laboratories, Inc.* v. *Nicolet Instrument Corp.*

3,399,791, Barns Lumber and Manufacturing Co., SIDE DUMPING TRAILER, **filed** July 3, 1984, D.C., E.D. Tyler (Paris), Doc. P-84-36-CA, *Goodwin-Barns Manufacturing Co., Inc.* v. *Sulphur Springs Lumber Co., Inc.*

3,529,574, Aquarium Systems, Inc., CORNER AIR LIFT FOR AQUARIUMS, **filed** July 18, 1984, D.C., C.D. Calif. (Los Angeles), Doc. 84 5313, *Aquarium Systems, Inc.* v. *Ocean Environments, Inc.*

3,559,644, Shaw Associates, LIQUID INFUSION APPARATUS; **3,618,602, same,** LIQUID INFUSION INFILTRATION DETECTION APPARATUS AND METHOD; **3,620,650, same,** GAS-DISABLED LIQUID PUMPING APPARATUS AND METHOD; **3,620,650, same,** GAS-DISABLED LIQUID PUMPING APPARATUS, **filed** June 22, 1984, D.C., N.D. Calif. (San Francisco), Doc. C84 4179 JPV, *Shaw Associates* v. *Oximetrix.*

3,564,632, William Bahne, ADJUSTABLE SURFBOARD FIN HOLDER, **filed** Nov. 26, 1980, D.C., S.D. Calif. (San Diego), Doc. 80-1868-G, *William Bahne, et al.* v. *Rax, Inc., et al.*

3,615,024, Amicon Corp., HIGH FLOW MEMBRANE, **filed** June 18, 1980, D.C. Del. (Wilmington), Doc. 80-302, *Amicon Corp.* v. *Osmonics, Inc.*

3,618,602. (See 3,559,644.)

3,774,056, Design & Manufacturing Corp., DIGITAL ELECTRONIC CONTROL CIRCUIT FOR CYCLICALLY OPERABLE APPLIANCES AND THE LIKE, **filed** July 10, 1984, D.C., S.D. Ohio (Cincinnati), Doc. C-1-84-984, *Design & Manufacturing Corp.* v. *Sharp Corp.* **Same, filed** July 10, 1984, D.C., S.D. Ohio (Cincinnati), Doc. C-1-84-985, *Design & Manufacturing Corp.* v. *Matsushita Electrical Industrial Co., Ltd.* **Same, filed** July 10, 1984, D.C., S.D. Ohio (Cincinnati), Doc. C-1-84-986, *Design & Manufacturing Corp.* v. *Sanyo Electric Co., Ltd.*

3,861,417, Gerald W. Rowe, INSTRUMENT CONSOLE FOR UNDERWATER DIVING APPARATUS; **4,197,417,** Carlton L. Koehler, UNDERWATER INSTRUMENT CASE, **filed** July 17, 1984, D.C., C.D. Calif. (Los Angeles), Doc. 84 1314, *Carlton L. Koehler* v. *Dacor Corp.* Stipulation and ordered to be dismissed with prejudice, filed May 31, 1984.

3,866,669. (See 3,751 014.)

3,873,897, Papst Motoren KG, COLLECTOR-LESS D-C MOTOR; **4,429,253, same,** LOW MAGNETIC LEAKAGE FLUX BRUSHLESS PULSE CONTROLLED D-C MOTOR; **4,438,542, same,** DISK STORAGE DRIVE, **filed** July 3, 1984, D.C. D.C. (U.S. Courthouse), Doc. 84-2014, *Shinano Tokki Corp.* v. *Papst Motoren KG.*

3,941,051, Gordon B. Barrus, PRINTER SYSTEM; **4,233,894, same,** PRINT HAMMER MECHANISM HAVING DUAL POLE PIECES, **filed** May 25, 1984, D.C., C.D. Calif. (Los Angeles), Doc. 84 3939, *Printronix, Inc.* v. *Mannesmann Tally Corp.*

3,973,913, Alan L. Louderback, BLOOD CONTROL STANDARD, **filed** July 20, 1984, D.C., C. D. Calif. (Los Angeles), Doc. 84 5405 AAH, *Alan L. Louderback, et al.* v. *Fisher Scientific Co., Inc.*

3,976,130, Joe G. Chambless, PACKING MEANS FOR A WELL-HEAD ASSEMBLY, **filed** May 9, 1984 D.C., C.D. Calif. (Los Angeles), Doc. 84 2351, *ACF Industries, Inc.* v. *Midway Fishing Tool Co.*

3,982,577, Mr. Tuffy Co., TUB GUARD, **filed** Dec. 9, 1983, D.C.N.J. (Trenton), Doc. 83-4793, *Mr. Tuffy Co., Inc.* v. *Kool-Stop, et al.* Stipulation of dismissal filed on Dec. 9, 1983.

4,034,918, Saturn Manufacturing Co., DRIVE ARRANGEMENT FOR ROTARY SHREDDING APPARATUS, **filed** June 7, 1984, D.C. Oregon (Portland), Doc. 84-1622, *Mac Corporation of America* v. *Shredding Systems, Inc., et al.*

4,053,740, Cinematronics, Inc. VIDEO GAME SYSTEM, **filed** Feb. 1, 1980, D.C., S.D. Calif. (San Diego), Doc. 80-0184-T, *Cinematronics, Inc.* v. *Atari, Inc.* Dismissed with prejudice, with each party to bear its own costs and attorneys' fees, filed Sept. 2, 1981.

4,057,257, David W. Berg, SEAL ASSEMBLY; **4,121,840, same, filed** May 15, 1984, D.C. MD. (Baltimore), Doc. k-84-1972, *Tol-O-Matic, Inc.* v. *Lanier Engineering Sales, Inc.*

4,060,066, Donald S. Kudlacek, COMPOUND ARCHERY BOW WITH ECCENTRIC CAM ELEMENTS, **filed** May 24, 1984, D.C., W.D. Wash. (Tacoma), Doc. C84-319T, *David J. Nurney* v. *Donald S. Kudlacek.*

4,076,970, Telecommunications Technology, Inc., SWITCHING SYSTEM HAVING A CENTRAL CONTROLLER FOR ACCESSING INDIVIDUAL TELEPHONE CIRCUITS FOR TESTING, **filed** May 24, 1984, D.C., N.D. Calif. (San Jose), Doc. C-84-20338 WAI, *Telecommunications Technology, Inc.* v. *Wiltron Co.*

4,096,577, Leon A. Ferber, THIN FLEXIBLE ELECTRONIC CALCULATOR, **filed** Nov. 15, 1983, D.C., S.D.N.Y., Doc. 84-Civ-8305 CES, *Leon Feber* v. *American Express Co.* Dismissed without prejudice, with each party to bear its own cost and attorney's fees, filed May 3, 1984.

4,108,118, Robert J. George, WATER JACKETED CYLINDER, **filed** May 25, 1984, D.C., C.D. Calif. (Los Angeles), Doc. 84-3938 WMB (Gx), *Robert J. George* v. *Honda Motor Co., Ltd.*

4,120,570, Syntex (U.S.A.), Inc., METHOD FOR CORRECTING VISUAL DEFECTS, COMPOSITIONS AND ARTICLES OF MANUFACTURE USEFUL THEREIN, **filed** July 13, 1984, D.C. Colo (Denver), Doc. 84-F-1439, *Syntex (U.S.A.), Inc.* v. *Wilsa, Inc.*

4,121,840. (See 4,057,257.)

4,136,359, Stephen G. Wozniak, DIGITALLY-CONTROLLED COLOR SIGNAL GENERATION MEANS FOR US WITH DISPLAY; **4,278,972, same, filed** May 21, 1984, D.C., C.D. Calif. (Los Angeles), Doc. 84-3751 IH, *Apple Computer, Inc.* v. *Roma Computer Systems, Inc.*

4,163,923, Dennis M. Herbers, VARIABLE DUTY CYCLE LAMP CIRCUIT, **filed** July 13, 1984, D.C., C.D. Calif. (Los Angeles), Doc. 84-5171 PAR (Bx), *Southwest Laboratories, Inc.* v. *Dennis M. Herbers, et al.*

4,179,163, Raymond C. Brown, SIMULATED WIRE SPOKE WHEEL ASSEMBLY, **filed** May 9, 1984, D.C., C.D. Calif. (Los Angeles), Doc. 84 2352, *Superior Industries International, Inc.* v. *Christian Diversified Industries.*

4,181,955, Mathematical Applications Group, Inc. APPARATUS FOR PRODUCING PHOTOGRAPHIC SLIDES, **filed** July 9, 1984, D.C., S.D.N.Y., Doc. 84-Civ-4816, *Mathematical Applications Group, Inc .* v. *R C Communication Inc.*

4,197,747. (See 3,861,417.)

4,213,028, Arend Wolf, ELECTRIC HEATING DEVICE FOR VEHICLE WINDOWS, **filed** Dec. 5, 1983, D.C., N.D. Ohio (Toledo), Doc. C 83-1097, *Audiovox Corp.* v. *Dana Corp.*

4,213,458, Hollister, Inc. SEALING AND ATTACHMENT FOR MEDICAL DRAINAGE POUCH, **filed** July 9, 1984, D.C., N.D. Ill. (Chicago), Doc. 84 C 5871, *Hollister, Inc.* v. *E.R. Squibb & Sons, Inc.*

4,220,252, Miles Laboratories, BIOLOGICAL SPECIMEN PROCESS APPARATUS, **filed** July 14, 1983, D.C., N.D. Ill. (Chicago), Doc. 84 C 4825, *Miles Laboratories, Inc.* v. *Surgipath Medical Industries, Inc.* Enter consent judgment that this patent is valid and enforceable and plaintiff is the owner, filed May 31, 1984.

4,221,013, Angel M. Echevarria, FLUID FLOTATION SLEEP SYSTEM, **filed** July 9, 1984, D.C., C.D. Calif. (Los Angeles), Doc. 84 5021 CHH (Bx), *Somma Mattress* v. *Celotto, Inc.* **same, filed** May 10, 1984, D.C., C.D. Calif. (Los Angeles), Doc. 84 3455 HCH (Rx), *Somma Mattress* v. *Sidney Alan Chappell.*

4,233,894. (See 3,941,051.)

4,247,051, Davies Allport, IRRIGATION HOSE AND METHOD FOR ITS CONSTRUCTION, **filed** Mar. 27, 1984, D.C., C.D. Calif. (Los Angeles), Doc. 84 1994 PAR, *T-Systems Corp.* v. *William Delmer, et al.*

4,248,975. (See 3,846,347.)

4,254,409, Quality Micro Systems, Inc., CONTROL SYSTEM FOR FULL LINE VARIABLE HEIGHT AND WIDTH CHARACTER AND SYMBOL PRINTING, **filed** Mar. 9, 1984, D.C., C.D. Calif. (Los Angeles), Doc. 84 1558, *Quality Micro Systems, Inc.* v. *Analogy Technology Corp.*

4,262,737. (See 3,751,014.)

4,278,972. (See 4,136,359.)

4,279,716, Ronald A. Horst, ODOR CONTROL SYSTEM, **filed** Apr. 24, 1984, D.C., C.D. Calif. (Los

Angeles), Doc. 84 2894 DWW (JRx), *A & E Systems, Inc.* v. *MME, Inc.* **Same, filed** Apr. 24, 1984, D.C., C.D. Calif. (Los Angeles), Doc. 84 2894 DWW (JRx), *A & E Systems, Inc.* v. *MME, Inc.* Deft admits that this patent is valid and that it has infringed such letters patent by the manufacture and sale of odor control systems designated by the Deft "Electrolysis Odor Control" systems, filed June 25, 1984.

4,295,532, Acra-Plant, Inc., PLANTER WITH CO-OPERATING TRASH CLEARING DISCS, **filed** Jan. 11, 1984, D.C. Neb. (Lincoln), Doc. CV84-L-26, *Acra-Plant, Inc.* v. *Orthman Manufacturing.* It is hereby stipulated that the case may be dismissed with prejudice, filed June 29, 1984.

4,298,601, Alan N. Howard, METHOD AND FORMULATIONS FOR THE TREATMENT OF OBESITY, **filed** Oct. 12, 1982, D.C., C.D. Calif. (Los Angeles), Doc. 82 5298, *Cambridge Plan International* v. *Richlife, Inc.* Consent judgment enjoining deft from sale, filed Nov. 8, 1982.

4,304,469, Charles I. Solomon, EYEGLASS FROME HAVING REMOVABLE LENSES, **filed** July 10, 1984, D.C.N.J. (Newark), Doc. Civ 84-2687, *Sol-Optics, Inc.* v. *Victory Optical Manufacturing Co., Inc.* **Same, filed** July 10, 1984, D.C.N.J. (Newark), Doc. Civ 84-2687, *Sol-Optics, Inc.* v. *Victory Optical Manufacturing Co., Inc.* Consent judgment for permanent injunction without costs, filed Aug. 1, 1984.

4,305,162. (See 4,208,747.)

4,316,579, Charles A. Ray, MULTI-PURPOSE SEAL FOR POP-UP SPRINKLER, **filed** Apr. 26, 1984, D.C., C.D. Calif. (Los Angeles), Doc. 84 2972, *Anthony Manufacturing Corp.* v. *L.R. Nelson Corp.*

4,323,961, Elliot Josephson, FREE-RUNNING FLYBACK DC POWER SUPPLY, **filed** May 11, 1984, D.C., C.D. Calif. (Los Angeles), Doc. 84 3497 IH, *Astec Components, Ltd.* v. *Bikor Corp., et al.*

4,328,540, Hitachi, Ltd., DOOR OPERATION CONTROL APPARATUS, **filed** June 12, 1984, D.C., N.D. Ill. (Chicago), Doc. 84 C 4943, *Chamberlain Manufacturing Corp.* v. *Hitachi, Ltd.*

4,342,122, Alan H. Levine, PROTECTIVE HEADGEAR, **filed** July 16, 1984, D.C., S.D.N.Y., Doc. 84-Civ-5018 (JFK), *Carl J. Abraham, et al.,* v. *Bike Athletic Co.*

4,343,032, Cable Electric Products, Inc., LIGHT SENSITIVE ELECTRICAL DEVICE, **filed** Feb. 25, 1984, D.C., N.D. Calif. (San Francisco), Doc. C-83-0897 WWS, *Cable Electric Products, Inc.* v. *Genmark, Inc.* Deft entitled to judgment on all claims plaintiff raises in amended complaint with deft to recover its costs, filed May 25, 1984.

4,356,600, George A. Welch, BAG CLOSURE DEVICE; **4,394,791,** Francis R. Croth, CLOSURE CLAMP FOR FOOD BAGS, **filed** Feb. 28, 1984, D.C., E.D. Missouri (St. Louis), Doc. 84-477C(5), *Aluminum Housewares Co., Inc.* v. *Chip Clip Corp.* This cause is dismissed without prejudice and costs to be taxed to each party respectively, filed June 25, 1984.

4,362,196, Hirsh Co., POWER TOOL TABLE WITH SAFETY SHUTOFF, **filed** May 4, 1984, D.C., N.D. Ill. (Chicago), Doc. 84 C 3883, *Hirsh Co.* v. *Central Quality Industries, Inc.*

4,363,959, E. R. Wagner Manufacturing Co., STAND-OFF FOR RESISTANCE WIRES, **filed** Jan. 18, 1984, D.C., E.D. Mo. (St. Louis), Doc. 84-01680 (A), *Intertherm Inc.* v. *E. R. Wagner Manufacturing Co.* Judgment filed on July 20, 1984.

4,365,802, Arthur H. Ehrat, DEFORMATION-PREVENTING SWINGABLE MOUNT FOR BASKETBALL GOALS; **4,433,839,** John Simonseth, BASKETBALL RING ASSEMBLY, **filed** June 2, 1984, D.C., N.D. Ill. (Chicago), Doc. 84 C 5601, *Basketball Products International* v. *Porter Equipment Co.*

4,365,802, Arthur H. Ehrat, DEFORMATION-PREVENTING SWINGABLE MOUNT FOR BASKETBALL GOALS, **filed** Jan. 18, 1984, D.C., W.D. Wash. (Seattle), Doc. C84-70R, *Basketball Products International Inc.* v. *Mount Vernon School District.* Order and judgment granting defendant's motion to dismiss, filed June 11, 1984.

4,375,442, Yoshino Kogyosho Co., Ltd., METHOD FOR PRODUCING POLYESTER CONTAINER; **4,379,099, same, filed** Apr. 26, 1984, D.C., N.D. Ga. (Atlanta), Doc. C84-820A, *Yoshino Kogyosho Co., Ltd.* v. *Sewell Plastics, Inc.* The Court shall retain jurisdiction over this matter for purposes of enforcement of this order, filed July 6, 1984.

4,379,099. (See 4,375,442.)

4,387,440, Michael D. Eaton, MODERN CONTROL DEVICE CODE MULTIPLEXING, **filed** July 16, 1984, D.C., N.D. Calif. (San Francisco), Doc. 84 4990 JPV, *Business Computer Corp.* v. *Qubie Distributing.* **Same, filed** July 12, 1984, D.C., N.D. Calif. (San Francisco), Doc. C-84-4882-SC, *Business Computer Corp.* v. *Prometheus Products Inc.*

4,388,064, The Scott & Fetzer Co., ENERGY EFFICIENT HIGH STATIC PRESSURE FLUID FUEL BURNER, **filed** May 21, 1984, D.C. Conn. (Hartford), Doc. H 84 594, *The Scott & Fetzer Co.* v. *The Carlin Co., Inc.*

4,392,770, Hub City Iron Works, Inc., PIPE HANDLING APPARATUS, **filed** May 15, 1984, D.C., W.D. La. (Shreveport), Doc. CV 84-1290 "O", *Hub City Iron Works, Inc.* v. *Pipe Handling Systems, Inc., et al.*

4,394,791. (See 4,356,600.)

4,395,043, Frank Gargione, GAME CHIP, **filed** Nov. 2, 1983, D.C.N.J. (Newark), Doc. 83-4206, *Keystone Bingo Products, Inc.* v. *Winston Imports Corp.* Order dismissed without action, filed May 7, 1984.

4,407,276, Medical Designs, Inc., BRACE FOR ARTICULATED LIMES, **filed** May 18, 1984, D.C., N.D. Texas (Forth Worth), Doc. CA4-84-188 E, *Medical Designs, Inc.* v. *Medical Technology, Inc.*

4,413,930, Jennmar Corporation, METHOD FOR APPARATUS FOR COMBINING RESIN BONDING AND MECHANICAL ANCHORING OF A BOLT IN A ROCK FORMATION; **4,419,805, same,** METHOD FOR COMBINING RESIN BONDING AND MECHANICAL ANCHORING OF A BOLT IN A ROCK FORMATION, **filed** May 2, 1984, D.C., S.D. Ohio (Columbus), Doc. C-2-84-00878, *Jennmar Corp.* v. *Pattin Manufacturing Co.* **Same filed** May 4, 1984, D.C., W.D. Va. (Roanoke), Doc. 84-8-0580, *Jennmar Corp.* v. *Advanced Mining Systems.*

4,418,510, Lantech, Inc., STRETCH WRAPPING APPARATUS AND PROCESS, **filed** July 13, 1984, D.C., N.D.N.Y. (Utica), Doc. 84-CV-970, *Muller Manufacturing Ltd., et al.* v. *Lantech, Inc.*

4,419,805. (See 4,413,930.)

4,423,745, Simplimatic Engineering Co., RINSING MACHINE, **filed** July 24, 1984, D.C., N.D. Calif. (San Jose), Doc. C 84 20475, *Simplimatic Engineering Co.* v. *Tonko Corp.*

4,423,882, UNR Industries, Inc. SHOPPING CART WITH BABY SEAT, **filed** July 2, 1984, D.C., N.D. Ill. (Chicago), Doc. 84 C 5603, *UNR Industries, Inc.* v. *Tote-Cart Co.*

4,429,263. (See 3,873,897.)

4,433,839. (See 4,365,802.)

4,438,542. (See 3,873,897.)

4,447,676, Telelogic, AUTOMATIC DIALER FOR TELEPHONE NETWORK ACCESS CONTROL, **filed** May 31, 1984, D.C., N.D. Calif. (San Jose), Doc. C-84-20348 WAI, *Telco Systems, Inc.* v. *Telelogic, Inc.*

4,457,805, Manual C. Pastor, OLIENT RECOVERY APPARATUS AND METHOD, **filed** July 3, 1984, D.C. W.D. Pa. (Erie), Doc. CA 84-202 Erie, *Finish Engineering Co., Inc.* v. *Zerpa Industries, Inc.*

D. 262,759, Francis E. Caldwell, EYEGLASS FRAME DISPLAY RACK, **filed** July 3, 1984, D.C.N.J. (Newark), Doc. CIV 84-2657 S, *Star-Line Optical Corp.* v. *Francis E. Caldwell.*

D. 269,594, Gold Eagle Co., BATTLE OR SIMILAR ARTICLE, **filed** May 31, 1984, D.C., N.D. Ill. (Chicago), Doc 84 C 4361, *Gold Eagle Co.* v. *MTD Products Inc.* The complaint against the deft is dismissed without prejudice, filed July 11, 1984.

D. 269,745, The Berkline Corp. SETTE, **filed** Mar. 27, 1984, D.C., N.D. Miss. (Oxford), Doc. WC84-56-WK-P, *The Berkline Corp.* v. *Johnson-Baker Furniture Mfg. Co., Inc.*

D. 270,741, Horn Abbott Ltd., GAME BOARD, **filed** July 9, 1984, D.C., S.D.N.Y., Doc. 84-Civ-4836, *Selchow & Righther Co.* v. *Andrew Rivkin.*

PATENT NOTICES

Certificates of Correction for the Week of Dec. 11, 1984

Re. 31,405	4,432,366	4,449,326	4,456,611
4,258,791	4,434,670	4,449,374	4,457,059
4,322,043	4,435,594	4,449,510	4,457,323
4,325,240	4,436,804	4,449,585	4,457,344
4,344,151	4,437,807	4,449,762	4,457,487
4,364,397	4,437,968	4,450,589	4,457,761
4,370,160	4,438,662	4,450,624	4,458,000
4,370,451	4,438,926	4,451,592	4,458,693
4,384,768	4,440,682	4,451,733	4,459,047
4,388,371	4,440,692	4,451,902	4,459,055
4,392,907	4,441,889	4,452,139	4,459,131
4,393,424	4,442,015	4,452,570	4,459,219
4,394,646	4,443,587	4,452,875	4,459,231
4,399,339	4,443,903	4,454,043	4,459,419
4,400,453	4,443,913	4,454,213	4,459,659
4,407,524	4,444,879	4,454,257	4,459,929
4,408,265	4,449,933	4,454,529	4,460,007
4,414,620	4,445,514	4,454,774	4,460,165
4,417,054	4,445,971	4,455,410	4,460,211
4,422,158	4,446,248	4,455,422	4,460,240
4,428,567	4,446,902	4,455,554	4,460,436
4,429,189	4,447,179	4,455,676	4,461,899
4,429,281	4,447,268	4,455,783	4,461,923
4,430,445	4,448,656	4,455,848	4,461,943
4,431,444	4,449,203	4,456,521	4,471,590

Disclaimers

3,399,201.—*Paul Schmidt,* Therwil, *Max Wilhelm,* Allschwil, and *Kurt Eichenberger,* Therwil, Switzerland. AMINOALKYL-ETHANO-ANTHRACENES. Patent dated Aug. 27, 1968. Disclaimer filed Oct. 22, 1984, by the assignee, *Ciba-Geigy Corp.*

Hereby enters this disclaimer to claims 1–19 and 21–25 of said patent.

3,515,785.—*Walter Schindler,* Riehen and *Henri Dietrich,* Arlesheim, Basel-Land, Switzerland. COMPOSITIONS AND METHODS FOR TREATING ENDOGENOUS DEPRESSION WITH 3-CHLORO-5-(γ-DIMETHYL-AMINO-PROPYL)-IMINODIBENZYL. Patent dated June 2, 1970. Disclaimer filed Oct. 22, 1984, by the assignee, *Ciba-Geigy Corp.*

Hereby enters this disclaimer to claims 2, 5, 6 and 7 of said patent.

3,558,690.—*Alfred Sallmann,* Bottmingen and *Rudolf Pfister,* Basel, Switzerland. SUBSTITUTED DERIVATIVES OF 2-ANILINOPHENYLACETIC ACIDS AND A PROCESS OF PREPARATION. Patent dated Jan. 26, 1971. Disclaimer filed Oct. 22, 1984, by the assignee, *Ciba-Geigy Corp.*

Hereby enters this disclaimer to claims 1–5, 7–9, 11–14, 18–20, 24 and 27 of said patent.

3,949,449.—*Jack E. Caveney,* Chicago, and *Roy A. Moody,* Flossmoor, Ill. INTEGRAL ONE-PIECE CABLE TIE. Patent dated Apr. 13, 1976. Disclaimer filed Oct. 10, 1984, by the assignee, *Panduit Corp.*

The term of this patent subsequent to May 9, 1989 has been disclaimed.

4,152,460.—*Barry A. Dreikorn,* Indianapolis, Ind. 3-CHLORO-2,6-DINITRO-N-(SUBSTITUTED PHENYL)-4-(TRIFLUOROMETHYL) BENZENAMINES. Patent dated May 1, 1979. Disclaimer filed May 29, 1984, by the assignee, *Eli Lilly and Co.*

Hereby enters this disclaimer to all claims of said patent.

4,161,449.—*James A. Smith,* Old Tappan, N.J., and *James H. McLaughlin,* Chatham, Mass. POWDERED CARPET COMPOSITION. Patent dated July 17, 1979. Disclaimer filed Jan. 3, 1984, by the assignee, *Airwick Industries, Inc.*

Hereby enters this disclaimer to all claims of said patent.

4,259,014.—*Yair Talmi,* Plainsboro, N.J. FIBER OPTIC POLYCHROMATOR. Patent dated Mar. 31, 1981. Disclaimer filed June 11, 1984, by the assignee, *Baylor University.*

Hereby enters this disclaimer to all of the claims of said patent.

4,380,346.—*Leland E. Davis,* Brigham City, *David P. Dahle,* Logan, *Fred E. Schneiter,* North Ogden and *George F. Kirchoff,* Brigham City, Utah. METHOD OF AND APPARATUS FOR SPEEDING THE RESPONSE OF AN AIR BAG INFLATOR AT LOW TEMPERATURES. Patent dated Apr. 19, 1983. Disclaimer filed May 10, 1984, by the assignee, *Thiokol Corp.*

Hereby enters this disclaimer to claim 1 of said patent.

Dedications

4,394,255.—*Semyon Kukes, Gerhard P. Nowack* and *Marvin M. Johnson,* Bartlesville, Okla. ISOMERIZATION PROCESS. Patent dated July 19, 1983. Dedication filed Oct. 23, 1984, by the assignee, *Phillips Petroleum Co.*

Hereby dedicates the entire remaining term of said patent to the Public.

4,451,106.—*Ronald W. Wiseheart,* Hector and *Daniel Meyer,* Rochester, Minn. SNAP IN COMMUNICATIONS JACK AND COVER PLATE ASSEMBLY. Patent dated May 29, 1984. Dedication filed Sept. 27, 1984, by the assignee, *Communications Systems, Inc.*

Hereby dedicates to the Public the entire term of said patent.

Disclaimers and Dedications

4,350,660.—*Grenville A. Robinson,* Hanwell, *Peter N. Kember,* Ealing, and *Derek K. Burns,* Wendover, England. AMMONIA GAS SENSORS. Patent dated Sept. 21, 1982. Disclaimer and Dedication filed Nov. 1, 1983, by the assignee, *Emi Ltd.*

Hereby disclaims and dedicates to the Public the entire remaining term of said patent.

4,369,286.—*Hubert Czepel, Friedl Heger* and *Wilhelm Dobramysl,* Linz, Austria. MODIFIED AMINOPLAST RESINS CONTAINING METHYLOL-MELAMINE ETHERIFIED WITH A MONOALCOHOL AS MODIFIER. Patent dated Jan. 18, 1983. Disclaimer and Dedication filed Sept. 10, 1984, by the assignee, *Chemie Linz Aktiengesellschaft.*

Hereby disclaims and dedicates to the Public the entire term of said patent.

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

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	San Diego Public Library	(619) 236-5813
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North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
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	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 422-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
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	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
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*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF October 1, 1984

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	6-18-82
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	9-29-82
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	6-15-82
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	6-19-80
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—B. R. GRAY, Director	9-24-82
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	6-29-81
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	2-22-82
RECEPTACLES, CLEANING, WINDING, AND MEASURING, GROUP 240—G. M. FORLENZA, Director	10-28-82
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—S. S. MATTHEWS, Director	5-09-80
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	4-07-82
DESIGN, GROUP 290—K. L. CAGE, Director	6-02-82
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—(Vacant)	9-01-82
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	9-30-82
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	6-08-82
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	8-25-82
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	12-04-81

Expiration of patents: The patents within the range of numbers indicated below expire during October 1984, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,344,433 to 3,350,717, inclusive

Plant Patents ..... Numbers 2,770 to 2,774 inclusive

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 31,759
CONTAINER WITH LID OPENING MEANS

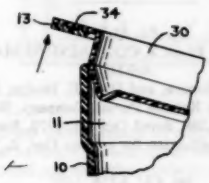
Ole Ingemann, Svendborg, Denmark, assignor to A/S Haustrup Plastic, Langeskov, Denmark

Original No. 4,207,989, dated Jun. 17, 1980, Ser. No. 958,502, Nov. 7, 1978. Continuation of Ser. No. 389,186, Jun. 16, 1982, abandoned. Application for reissue Jun. 17, 1982, Ser. No. 389,346

Claims priority, application Sweden, Nov. 17, 1977, 7712987

Int. Cl.³ B65D *41/32*

U.S. Cl. 220—266 **19 Claims**



6. The combination of a container and lid in which the lid is removable from the container to open the latter and is replaceable to close the container, said container including a body having a mouth, said mouth including a strip of annular extent secured to said lid, said body of the container being provided with an annular weakening notch in the vicinity of said strip where the mouth of the container is secured to the lid, said container being separable at said notch to separate a part of said container mouth and the lid together with said strip from said body, said notch being positioned radially inwards of said strip and upon rupture of the notch forming separating parts which can be reengaged upon replacement of the lid on said container, and locating surfaces on said lid and container for establishing a determined, oriented position of replacement of the lid on the body of the container, and means provided on said lid and container for providing firm fit between said lid and container upon replacement of the lid on the container.

Re. 31,760
BABY CARRIAGE

Kenzou Kassai, Osaka, Japan, assignor to Kassai Kabushikikaisha, Osaka, Japan

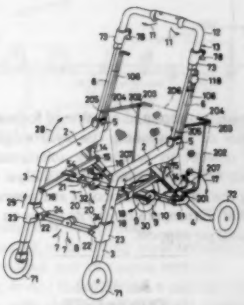
Original No. 4,317,581, dated Mar. 2, 1982, Ser. No. 141,265, Apr. 17, 1980. Application for reissue Feb. 10, 1983, Ser. No. 465,481

Claims priority, application Japan, Oct. 13, 1979, 54-132136; Nov. 9, 1979, 54-156262; Feb. 6, 1980, 55-14370

Int. Cl.³ B62B *7/06*

U.S. Cl. 280—644 **28 Claims**

1. A baby carriage comprising: means for supporting the baby carriage with respect to the ground including a pair of front legs (3) each having a wheel (71), a pair of rear legs (4) each having a wheel (72), and connecting members (8, 10) for determining the distance between said front legs and between said rear legs; folding initiating means including a pair of pusher rod support angle bars (14) extending relatively upwardly and pivotally supported, each at its one end, on said pair of rear legs (4), and a pair of pusher rod means (6) pivotally connected at their lower ends to the other ends of said pusher rod support angle bars (14) and extending relatively vertically; connecting means (1, 18, 21, 23, 24, 25, 26, 30) operatively connected between said folding initiating means and said support means and so arranged that when said pusher rod support angle bars (14) are turned substantially downwardly in response to a downward displacement of said pusher rod means (6), said front legs, said rear legs and said connecting members are actuated for moving said front legs (3), said rear legs (4) and said pusher rod means (6) toward one another, said connecting means comprising a pair of front and rear leg supporting rods (1) including pivot means for pivotally supporting said pair of front legs (3) substantially at one end of said supporting rods (1) and said pair of rear legs (4) substantially intermediate the ends of said supporting rods (1), said supporting rods (1) comprising substantially at the other end thereof further pivot means (5) for said push rod means (6), and wherein said connecting means further comprise a pair of



connecting rod turning members (23) each slidably fitted on the respective front leg (3) in the central region thereof, a pair of bar links (25) connected between said pair of connecting rod turning members (23) and said pair of supporting rods (1) adjacent their front end, a pair of pivotally installed arms (26) extending inwardly from said pair of front legs (3), said *connecting members (8, 10) of said* carrage [further comprising] *supporting means including a* downwardly foldable front leg connecting [means] *member* (8) pivotally supported at its opposite ends by said connecting rod turning members (23) and also pivotally supported by said arms (26) at pivots points (27) spaced a predetermined distance from each end of said front leg connecting [means] *members* (8).

Re. 31,761
METHOD OF PREPARING ZIRCONIA-SILICA XEROGELS, THE XEROGELS, AND XEROGEL CATALYSTS

Robert A. Dombro, Palatine, Ill., and William Kirch, Clinton, Iowa, assignors to Chemplex Company, Rolling Meadows, Ill.

Original No. 4,246,137, dated Jan. 20, 1981, Ser. No. 44,004, May 31, 1979. Application for reissue Jan. 17, 1983, Ser. No. 458,520

Int. Cl.³ B01J *27/02, 27/24, 29/00*

U.S. Cl. 502—236 **12 Claims**

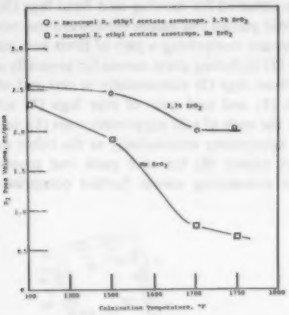
1. The method of preparing large pore volume zirconia-silica useful as a catalyst support for a catalyst for polymerizing and copolymerizing olefins, comprising:

a. reacting a zirconium compound of the formula $M_4Zr(C_2O_4)_4.nH_2O$, where M is an alkali metal or ammonium ion and n equals 0 to 10, with a silicon compound of the type A_2SiO_3, where A is an alkali metal, in a aqueous solution at a pH of at least 11 and then adding an acidic material to a pH of about 5–9, to produce a hydrocogel;

b. aging said hydrocogel at a temperature between about ambient to 90° C. for at least one hour;

c. washing said hydrocogel of b [first with water, then with aqueous ammonium nitrate and again with water] *free of soluble by-products with an aqueous liquid;*

d. removing water from the resulting washed hydrocogel of c to produce a xerocogel by azeotropic distillation by



mixing with a compound capable of forming an azeotrope with water or by washing the hydrocogel with a water miscible solvent to produce a substantially water-free, large pore volume zirconia-silica catalyst support; and

e. calcining the resulting xerocogel at a temperature of about 1000°–1800° F. preparatory to its use as an olefin polymerization catalyst support.

Re. 31,762
CONTAINER

Donald C. Vosti, Crystal Lake, Ill., and Alan Silverman, Wilton, Conn., assignors to American Can Company, Greenwich, Conn.

Original No. 4,125,632, dated Nov. 14, 1978, Ser. No. 824,806, Aug. 15, 1977. Continuation-in-part of Ser. No. 743,960, Nov. 22, 1976, abandoned. Application for reissue Nov. 13, 1980, Ser. No. 206,386

Int. Cl.³ B65D *7/42, 85/72*

U.S. Cl. 426—111 **7 Claims**

21. A body for a container adapted when closed to hold a product under vacuum without substantial deformation of the body and without unwanted ingress of oxygen into the body, comprising,

an elongated tubular sidewall merging at one end into a bottom wall closing said one end, and merging at the other end thereof into means for hermetically securing a closure thereto for closing said other end,

said sidewall and bottom wall being integrally formed from synthetic resinous material,

said sidewall and bottom wall having a high resistance to the permeability of oxygen,

said sidewall throughout a substantial and major portion of its axial length extending from said other end having substantial rigidity and resistance to inward deformation in response to internal vacuum,

said sidewall along the remaining portion of its axial length adjacent said one end, and, said bottom wall thereat together having sufficient flexibility for limited deformation in response to internal vacuum thereby to permit said bottom wall to deform axially inwardly of said tubular sidewall as the edge of said sidewall at said one end deflects radially inwardly, and the remaining sidewall portion between said edge and its juncture with said major sidewall portion, deforms to bulge slightly outwardly relative to said edge,

whereby said body can achieve a diminished container volume to lower the vacuum level therewithin.

Re. 31,763
ANIMAL FEED BLOCK CONTAINING MAGNESIUM OXIDE

Leroy V. Skoch, Glencoe, and Dean E. Hodge, Ladue, both of Mo., assignors to Ralston Purina Company, St. Louis, Mo.

Original No. 4,171,385, dated Oct. 16, 1979, Ser. No. 893,734, Apr. 5, 1978. Application for reissue Dec. 2, 1983, Ser. No. 557,700

Int. Cl.³ A23K *1/02*

U.S. Cl. 426—658 **10 Claims**

1. A process for preparing a molasses based feed block which comprises: admixing about 18 to 74% by weight molasses, a water soluble phosphorous source selected from the group consisting of ammonium polyphosphate and tetrasodium pyrophosphate, about 0.5 to 5% by weight water absorbent clay and 5–30% water under high speed shearing action for an effective amount of time to disperse the clay, admixing about 5 to 30% by weight animal fat and magnesium oxide in an amount effective to obtain a viscous nutrient mixture that solidifies to form a hard weather resistant block said block having a water activity of 0.8 to 0.9.

Re. 31,764
PHARMACEUTICALS HAVING DOTTED ACTIVE INGREDIENTS AND A METHOD AND APPARATUS FOR THE PREPARATION THEREOF

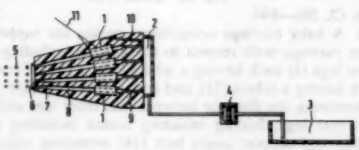
Gunther Voss, Diessen, and Peter Gruber, Biberach, both of Fed. Rep. of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Fed. Rep. of Germany

Original No. 4,322,449, dated Mar. 30, 1982, Ser. No. 109,420, Jan. 3, 1980. Continuation-in-part of Ser. No. 94,238, Nov. 14, 1979, abandoned. Application for reissue Oct. 12, 1982, Ser. No. 433,848

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1978, 2948494

Int. Cl.³ A61K *9/00*

U.S. Cl. 427—3 **6 Claims**



1. A method for the preparation of solid pharmaceuticals, which comprises dotting liquid, dissolved or suspended active substance in a specific quantity in the form of discrete droplets of specific volume onto a pharmaceutical carrier granulate in a mold before the pharmaceutical carrier granulate is pressed into tablets or cores.

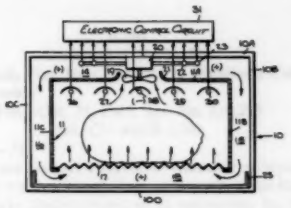
Re. 31,765
COUNTER-TOP OVEN

Raul Guibert, Los Angeles, Calif., assignor to Sunset Ltd., Los Angeles, Calif.

Original No. 4,374,319, dated Feb. 15, 1983, Ser. No. 221,206, Dec. 30, 1980. Continuation-in-part of Ser. No. 97,787, Nov. 27, 1979, Pat. No. 4,307,286. Application for reissue Dec. 14, 1983, Ser. No. 561,512

Int. Cl.³ A21B *1/22*; F27D *11/02*

U.S. Cl. 219—400 **15 Claims**



1. A counter-top oven adapted to effect low-temperature cooking of food having a predetermined cooking temperature at a relatively rapid rate whereby nutrients and other valuable food constituents are preserved, said oven comprising:

A. A food-receiving compartment having a perforated bottom wall and a top wall provided with a port, said compartment being supported within a case and being spaced therefrom to create air spaces therebetween;

B. means external to said compartment to heat air to a high temperature level well above said cooking temperature and to force the hot air through the perforations in said bottom wall at high pressure to produce a high velocity flow of hot air through the compartment in heat exchange relation with the food therein, the hot air being discharged from the compartment through the port, said means being constituted by a motor-driven fan in one of said air spaces arranged to draw air from said compartment through said top wall port to produce a negative pressure in said compartment and a positive pressure in the air spaces, the resultant pressure differential forcing air through said perforations; and

C. means periodically to interrupt the flow of hot air to generate within the compartment hot air pulses having no-flow intervals therebetween in a manner creating a laminar heat transfer pattern wherein heat acquired by the outer layer of the body of food in the compartment is transferred in these intervals to the intermediate layers and core of the body, causing the outer layer to go down in temperature during these intervals to a degree preventing the temperature of the outer layer from ever rising substantially above the cooking temperature despite the much higher temperature of the hot air pulses in heat exchange relation therewith.

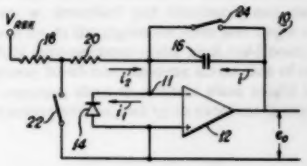
Re. 31,766
SENSOR INTEGRATOR SYSTEM

James A. White, Elkhart, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Original No. 4,313,067, dated Jan. 26, 1982, Ser. No. 507,883, Jul. 16, 1979. Application for reissue Mar. 1, 1982, Ser. No. 353,410

Int. Cl.³ G06G *7/12*; H03K *5/00*

U.S. Cl. 307—494 **6 Claims**



1. A sensor-integrator comprising:

an amplifier having an inverting input terminal, a noninverting input terminal and an output terminal;

a light sensing device that provides a current which varies in accordance with the intensity of light energy applied to said device, said light sensing device having first and second terminals;

passive circuit means for direct current coupling said first and second terminals to said input terminals;

a reference current source coupled to [one of] said *inverting* [inputs] *input terminal* and switching means coupled to said reference current source for selectively rendering said reference current source operative to supply a predetermined reference current to [one of] said *inverting* [inputs] *input*; and

charge storage means coupling said output terminal and said inverting input terminal and cooperating with said amplifier for providing at said output terminal an output voltage proportional to the total current applied to said input terminals over a predetermined time interval.

PLANT PATENTS

GRANTED DECEMBER 11, 1984

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

5,364

CARNATION PLANT

Forese Salviatti, Pisa, Italy, assignor to Dianticola Columbiana Ltda., Colombia

Filed Oct. 23, 1981, Ser. No. 315,297
Int. Cl.³ A01H *5/00*

U.S. Cl. Plt.—71 **1 Claim**

1. A new and distinct cultivar of *Dianthus caryophyllus, L.* known by the cultivar name Eolo, as described and illustrated, and particularly characterized as to uniqueness by the combined characteristics of commercial double flower type; cupola flower form when open; very small flower size; pink-lilac flower color; 4 to 7 flowers and buds showing color per flowering stem; strong peduncle and short peduncle length; five sepals; thirty-two petals; petals having insignificant serrations and long nail.

5,365

CHRYSANTHEMUM PLANT NAMED ALERT

William E. Duffett, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Feb. 18, 1983, Ser. No. 467,861
Int. Cl.³ A01H *5/00*

U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct cultivar of *Chrysanthemum morifolium,* Ramat., named Alert, as described and illustrated, and particularly characterized as to uniqueness by the combined characteristics of flat capitulum form; daisy capitulum type; scarlet bronze ray floret color; diameter across face of capitulum ranging from 55 to 65 mm. at maturity; uniform eight week flowering response; medium plant height; semi-upright branching pattern, and yellow green discs that remain pollen free.

5,366

CHRYSANTHEMUM PLANT NAMED ILLINI SUNSET

John R. Culbert, Clinton, Ill., assignor to University of Illinois, Chicago, Ill.

Filed Apr. 25, 1983, Ser. No. 488,013
Int. Cl.³ A01H *5/00*

U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct cultivar of chrysanthemum named Illini Sunset, as described and illustrated, and particularly characterized by its flat capitulum form and single capitulum type which is semi-anemone under cool conditions; maroon-pink ray florets; 50–65 mm. diameter across face of capitulum; 8–9 week response; short to medium plant height and semi-upright branching pattern, and by its excellent flower production.

5,367

CHRYSANTHEMUM PLANT NAMED—ILLINI WINDMILL

John R. Culbert, Clinton, Ill., assignor to University of Illinois, Chicago, Ill.

Filed Apr. 25, 1983, Ser. No. 488,073
Int. Cl.³ A01H *5/00*

U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct cultivar of chrysanthemum plant named Illini Windmill, as described and illustrated, and particularly characterized by its flat capitulum form and single anemone capitulum type, white ray florets and yellow-green to bright yellow disc florets, 60–70 mm. across face of capitulum, short and compact growth and semi-upright branching patterns, excellent flower form and color, and by its long shelf life.

PATENTS

GRANTED DEC. 11, 1984

ERRATA

For CLASS	See PATENT NO.
047–001	4,486,905
029–518	4,486,925
446–220	4,486,975
384–620	4,487,460
355–014	4,487,506
252–033	4,487,658
174–028	4,487,660
534–768	4,487,719
423–555	4,487,784
568–756	4,487,987
568–943	4,487,988

PATENTS

GRANTED DECEMBER 11, 1984

GENERAL AND MECHANICAL

4,486,901

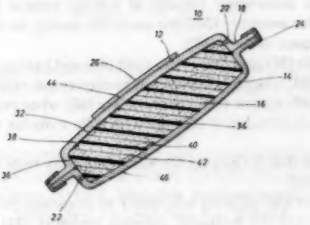
MULTI-LAYERED, OPEN-CELLED FOAM SHOCK ABSORBING STRUCTURE FOR ATHLETIC EQUIPMENT

Byron A. Donzis, Houston, Tex., assignor to Houston Protective Equipment, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 357,588, Mar. 12, 1982, abandoned. This application Mar. 25, 1983, Ser. No. 478,681

Int. Cl.³ A41D *13/00*

U.S. Cl. 2—2 **9 Claims**



1. Shock absorbing structure for athletic equipment to protect a wearer from infliction of an externally applied force, comprising:

a flexible enclosure having first and second faces and a periphery defining a cavity, said first and second faces being air impermeable and said periphery having at least one air impermeable region and at least one air permeable region such that said cavity is in continuous fluid communication with the atmosphere outside the shock absorbing structure;

a flexible open-celled foam portion comprising a multi-layered laminate of at least three open-celled foams of different foam density including inner, outer and intermediate foam layers each having two faces, one face of said intermediate foam layer being bonded to one face of said inner foam layer and the other face of said intermediate foam layer being bonded to one face of said outer foam layer, said foam portion having first and second faces disposed adjacent to and bonded at least in part to said first and second faces, respectively, of the flexible enclosure, and having a periphery disposed adjacent said periphery of the flexible enclosure, the cells of said foam portion releasably holding a volume of air selectively varied between first and second volumes differing by a volume differential in response to application and removal of the force on the shock absorbing structure, said volume differential being transferred between the foam portion and the atmosphere outside the shock absorbing structure through said at least one air permeable region of the periphery of the flexible enclosure; and

shield structure disposed outside said flexible enclosure adjacent the face of the multi-layered laminate having the highest foam density to distribute the applied force across at least a portion of said face.

4,486,902

FUSION BONDING INTERLINING STRIP

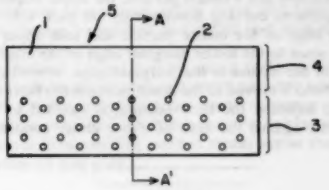
Katsuhide Sakai, Osaka, Japan, assignor to Firma Carl Freudenberg, Weinheim, Fed. Rep. of Germany

Filed Dec. 30, 1982, Ser. No. 454,639

Claims priority, application Japan, Feb. 3, 1982, 57-16740

Int. Cl.³ A41D *1/00*

U.S. Cl. 2—97 **4 Claims**



4. A cloth garment comprising: (a) a back fabric structure comprising a facing and a front lining which have been co-joined by sewing together overlapping parallel edges; (b) a front fabric structure comprising an outer front garment body integrally joined to a front interlining; and (c) an interposed fusion bonding interlining strip comprising a fabric base strip wherein the suface of said base strip facing said back fabric structure is longitudinally divided into a bonding portion comprising a fusion bonding adhesive and a non-bonding portion which does not include said adhesive and wherein said non-bonding portion of said interlining strip is sewn to said front fabric structure along a line parallel to and adjacent to said parallel edges of said back fabric structure, and wherein said bonding portion of said interlining strip is thermally bonded to said sewn edges of said back fabric structure whereby said back fabric structure and said front fabric structure are closed without adversely affecting the hand of the garment cloth.

4,486,903

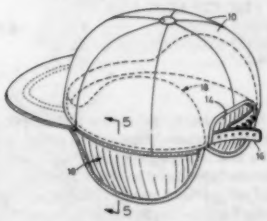
CAP WITH EAR BAND

Joseph Krystal, 16 Plymouth Ave., Toronto, Ontario, Canada M6J 1Z1

Continuation of Ser. No. 349,181, Feb. 17, 1982,. This application Jan. 30, 1984, Ser. No. 575,479

Int. Cl.³ A42B *1/06*

U.S. Cl. 2—197 **1 Claim**



1. A cap comprising:

a head cover of textile fabric having a lower marginal edge and having a back opening in the back portion of the head cover and in the lower marginal edge thereof;

a peak extending from the front centre portion of the head cover;

an adjustable strap across the lower edge of the back open-

ing whereby the size of the marginal edge of the head cover can adjust to fit the wearer;

an inband of textile fabric for the head cover hinged to the edge of the head cover and extending around the marginal edge of the head cover from one side edge of said back opening around said front centre portion and to the other side edge of said back opening;

said hinged inband being foldable between a folded position above the marginal edge of the head cover juxtaposed to the head cover and a down position where it extends below the marginal edge of the head cover;

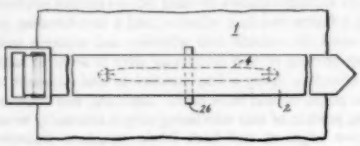
said lower marginal edge of the head cover being straight and said inband having a free pattern shape including two side portions and a centre portion, the upper edges of the side portions curving downwardly on each side of the upper edge of the centre portion and said upper edges being sewn to the lower marginal edge of the head cover to form the inband to the marginal edge, whereby when the inband is moved to the down position the fabric of the inband adjacent the back opening is stressed to bias it inwardly against the head of a user under conditions of use.

4,486,904

BELT SECURING MEANS

William P. Gonce, Phoenix, and Edward S. Bilezikian, Baltimore, both of Md., assignors to Londontown Corporation, Eldersburg, Md.

Filed Mar. 10, 1983, Ser. No. 473,890
Int. Cl.³ A41F 9/00
U.S. Cl. 2—312 **5 Claims**



1. A belt securing means comprising:

a belt having a pair of vertical slots; and

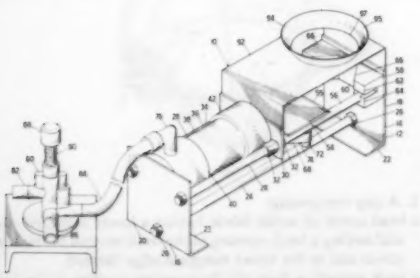
a flexible strip having tapered split end portions terminting into arrow heads, said end portions further having a curved radius portion adapted to engage said vertical slots thus retaining said means onto said belt.

4,486,905

UNDERWATER FLOWER CUTTER

Albert H. Felly, 544 W. Washington Ave., Madison, Wis. 53703

Filed Jan. 4, 1982, Ser. No. 337,075
Int. Cl.³ A01G 3/00
U.S. Cl. 47—1 R **6 Claims**



1. An underwater flower cutter (10) for cutting flower stems (96), adapted for operation while submersed beneath water, comprising:

(a) a frame (12) having a selected horizontal length;

(b) an hydraulic cylinder assembly (34) supported underwater by the frame (12) at one end thereof and having a piston housing (36) with a water supply port (76) near one end thereof and a water vent (78) near the other end, the vent (78) permitting communication between the inside of the piston housing (36) and the surrounding water and being sized to control the rate of water flow between the interior of the piston housing and the surrounding water, a piston head (44) adapted to move reciprocally within the piston housing (36) with high pressure side facing the water supply port (76) and a low pressure side facing the water vent (78), and a power shaft (48) attached to the piston head (44) and extending horizontally beyond the housing toward the end of the frame remote from the hydraulic cylinder assembly;

(c) an anvil (58) attached to the frame (12) and being supported underwater thereby at a point remote from the cylinder assembly (34), the anvil (58) having an underwater impact surface (60);

(d) a knife (54) attached to the shaft (48) and having a cutting edge (55) adapted to be driven by movement of the power shaft (48) against the impact surface (60) when pressurized water is introduced into the hydraulic cylinder assembly (34);

(e) means (68) for biasing the knife (54) away from the anvil (58); and

(f) a valve (80) adapted selectively to introduce pressurized water into the hydraulic cylinder assembly (34) through the water supply port (76) thereby forcing the piston head (44) away from the water supply port (76), causing water to flow from inside the piston housing (36) through the water vent (78) at a controlled rate and causing the power shaft (48) to drive the cutting edge (55) of the knife (54) against the impact surface (60), whereupon flower stems (96) previously placed therebetween may be cut, and the valve also adapted to subsequently allow pressurized water in the hyraulic cylinder (34) to be exhausted through the water supply port (76) thereby allowing the biasing means (68) to withdraw the cutting edge (55) of the blade (54) from the impact surface (60) and force the piston head toward the water supply port, return movement of the piston head being controlled by the rate at which the surrounding water may be drawn into the piston housing (36) through the water vent (78).

4,486,906

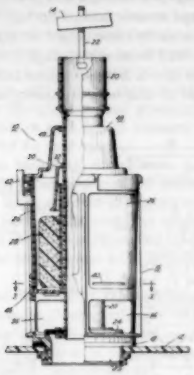
WATER-SAVING FLUSH VALVE

Robert Meier, Rapperswil, Switzerland, assignor to Geberit Manufacturing, Inc., Michigan City, Ind.

Filed Jun. 9, 1983, Ser. No. 502,692
Int. Cl.³ E03D 1/34
U.S. Cl. 4—378 **16 Claims**

1. A flush valve assembly for use in the water storage tank of a toilet, said tank having a water outlet in the bottom thereof, said valve comprising a valve shaft having a sealing means at the lower end thereof for closing the water outlet of the tank, said valve shaft being vertically slidable for sealing and unsealing the tank outlet, a valve cup having a buoyant means disposed therein, said valve cup having a port means near the lower end thereof for releasing water stored in said cup, an abutment means secured to said valve shaft and disposed above said buoyant means for cooperating with said buoyant means

to lift said shaft and sealing means and to control the rate of descent of said shaft after a flush cycle has been initiated, and



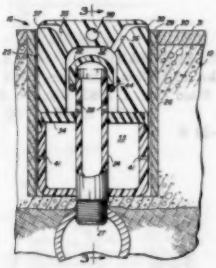
an adjustment means for varying the size of said port means for changing the rate of the release of the water from said cup.

4,486,907

SELF-FLUSHING ROTATABLE POP-UP WATER DELIVERY HEAD FOR POOL CLEANING SYSTEMS

Heard L. Carter, 8412 E. Malcomb, Scottsdale, Ariz. 85253

Filed Sep. 12, 1983, Ser. No. 531,062
Int. Cl.³ E04H 3/20
U.S. Cl. 4—490 **9 Claims**



1. A rotatable pop-up water delivery head for positioning in an opening in the surface of a swimming pool and for connection to a swimming pool cleaning system comprising:

a conduit for positioning in said opening and connectable at one end to said cleaning system and closed at its other end,

a hollow, cylindrical, closed ended housing slidably mounted around said conduit for a limited movement therealong,

wall means formed in said housing at a point between its ends around said conduit and defining two cavities in said housing, one on each side of said wall means, with said other end of said conduit being positioned in one of said cavities,

an outlet port in said conduit at a point within said housing, said outlet port upon slidable movement of said housing being positioned in said one of said cavities when water under pressure is absent in said conduit and positioned in the other of said cavities when water under pressure exists in said conduit,

a first conduit means formed in one end of said housing interconnecting at one end with the other of said cavities to form an inlet port and terminating at its other end in an outlet port for projecting a pressurized stream of water from said other of said cavities laterally to the axis of said housing in a direction substantially parallel and in a scrubbing relation to the surface of an associated pool when said housing is moved, positioning said outlet port in said other of said cavities,

a second conduit means formed in said one end of said housing and extending from said one of said cavities through said one end of said housing and diametrically out of the sides of said one end tangentially thereof for rotating said housing when said outlet port is in said one of said cavities,

whereby when water under pressure is forced through said conduit, it will flow through said outlet port into said one of said cavities and out of said second conduit means to rotate said housing and axially move said housing along said conduit to position said outlet port in said other of said cavities,

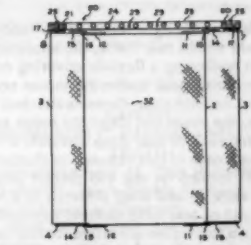
the movement of said housing along said conduit causing said wall means to open said outlet port into said other of said cavities causing water under pressure to move through said first conduit means and to exit in a scrubbing manner from said first conduit means across the adjacent surface of said pool.

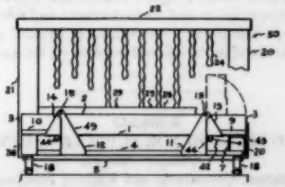
4,486,908

SUPPORT BED

Warren C. Schroeder, Gellett Suite C-603, 2400 Virginia Ave., NW., Washington, D.C. 20037

Filed Jul. 23, 1981, Ser. No. 259,600
Int. Cl.³ A47C 19/00; A61G 7/00
U.S. Cl. 5—60 **6 Claims**





1. A support bed which comprises: a main frame for supporting a box spring and a center mattress, said main frame having a head end, a foot end, a right side, and a left side; said main frame comprising: a pair of box beams extending in a longitudinal direction, said box beams forming the left and right side of the main frame; a longitudinal support structure located between said box beams, said longitudinal support structure supporting said center mattress and box spring; a head end support structure connected transversely to said box beams and said longitudinal support structure; a foot end support structure connected transversely to said box beam and said longitudinal support structure; an intermediate support structure connected transversely to said box beams and said longitudinal support structure; a pair of auxiliary frames, one located

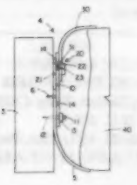
on the left side of the main frame, the other located on the right side of the main frame, said pair of auxiliary frames supporting a pair of side mattresses, each of said auxiliary frames comprising a mattress support pan: hinge means connecting the auxiliary frames to the main frame, said hinge means comprising: inner hinge mounts connected to the ends of said mattress pans; outer hinge mounts connected to said foot end and head end support structure inner bushings set into said inner hinge mounts; outer bushings set into said inner bushings forming hinge points about which mattress support pans can rotate through a ninety-degree arc; and a power means for rotating said auxiliary frames independently of each other from a horizontal plane to a vertical plane.

4,486,909

MEANS FOR ANCHORING SHEET TO WATERBED

Robert L. McKeelan, 774 Bayou Liberty Rd., #6F, Slidell, La. 74058

Filed Jun. 2, 1980, Ser. No. 155,108
Int. Cl.³ A47C *27/08*; A47G *9/00*
U.S. Cl. 5—451 **1 Claim**



1. In a waterbed including a frame and a fluid-containing mattress positioned within said frame, the improvement comprising means for anchoring a flexibile covering over the top surface of said mattress, said anchoring means comprising a plurality of spaced, resilient strap elements attached by one end of each thereof to the inside and about the inside periphery of said frame, and for each of said strap elements a removeable connection element, each of said connection elements having a first button means located on one end thereof adapted to releaseably attach same to said strap element, in a button hole provided in the end of said strap element removed from said frame, and having a second button means located on the other end thereof adapted to releaseably attach same in a button hole provided in said bed cover, said first and second button means being interconnected by a rigid element, said anchoring means and said button holes in said strap elements and said bed cover being correspondingly and cooperatively located so that said cover is maintained in the desired position on the surface of the mattress.

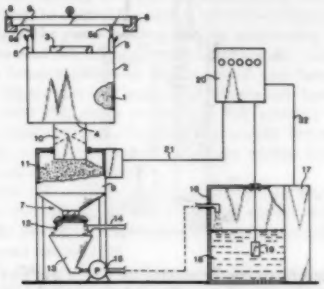
4,486,910

METERING METHOD FOR SUPPLYING DETERGENT CONCENTRATE

Günter Saalmann, Gevelsberg, and Richard Haslberger, Hallabruck, both of Fed. Rep. of Germany, assignors to Lang Apparatebau GmbH, Siegsdorf, Fed. Rep. of Germany

Filed Apr. 23, 1982, Ser. No. 371,132
Claims priority, application Fed. Rep. of Germany, May 13, 1981, 3118973
Int. Cl.³ D06F *39/02*
U.S. Cl. 8—158 **2 Claims**

1. A method for supplying measured amounts of water soluble or water insoluble powdered or granular detergent concentrate to a commercial washing machine or laundry which comprises suspending a delivery container having a pour hole at its bottom above a storage means in a metering device having a rotating disk upon which detergent concentrate from the storage means falls; connecting a substantially dust-tight tubular closable channel from the bottom of said delivery container to the top of said storage means; providing detergent concentrate to said delivery container; closing and opening said closable channel to cause some or all of said detergent concentrate to move by gravity feed through said pour hole and said channel to said storage means; and metering the supply of said detergent concentrate by causing said detergent concentrate to move by gravity feed from said storage means onto the rotating disk and then into a hopper situated below said rotating disk, adding water to said hopper, mixing said detergent concentrate with said water in a predetermined ratio in the mixing means whereby said water acts as a solvent and/or conveying means, and pumping the resulting detergent concentrate-water mixture to the commercial washing machine or laundry, the moving of concentrate by gravity feed, adding of water, and pumping being activated in response to changes in a predetermined value in the electrical conductance of the wash water in the commercial washing machine or laundry.

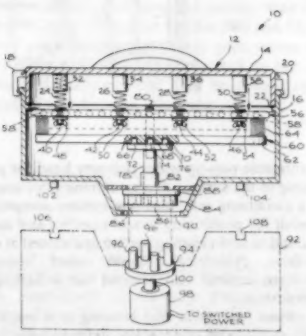


4,486,911

AUTOMATIC BARBECUE-GRILLE CLEANER

Steven J. Beke, 150 Allen, Glendale, Calif. 91201

Filed Dec. 2, 1983, Ser. No. 557,244
Int. Cl.³ A46B *13/00*
U.S. Cl. 15—21 R **10 Claims**



1. A barbecue-grille cleaner including:
a liquid-sealable container, said liquid-sealable container having a cover portion and a body portion; and,
a base adapted to receive said container;
said cover portion having suspension means for supporting a barbecue-grille in non-rotatable relationship therewith when said barbecue-grille is to be cleaned;
said body portion having a bottom;
a liquid-sealed rotary joint supported centrally in said bottom;

a spindle passing through and rotatably supported in said rotary joint;

said spindle having first and second ends, said first end terminating in a brush-receiving coupler, said second end terminating in a driven element, said driven element including a plurality of sockets exposed for receiving driving pins;

said base including a driving element rotatably supported centrally therein, said driving element having a plurality of driving pins therein sized and positioned to cooperate with said sockets in said driven element when said container is received by said base;

said body portion including, in addition, a brush having a base portion and a cleaning element portion;

said base portion being adapted to engage said brush-receiving coupler of said spindle centrally of said base portion;

said cleaning element portion extending upwardly from said base portion for engagement with a barbecue-grille to be cleaned;

the length of said suspension means being such that said barbecue-grille to be cleaned engages said cleaning member of said brush forcefully when said cover portion carrying said barbecue-grille is in operating engagement with said body portion of said container.

4,486,912

MOP

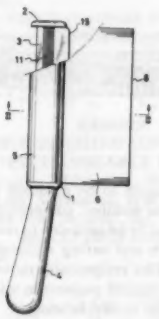
Nobuhiko Suzuki, Post No. 432, 2114-18, Tomitsuka-Cho, Hamamatsu City, Shizuoka Prefecture, Japan

Filed Jun. 10, 1983, Ser. No. 503,058

Claims priority, application Japan, Jun. 19, 1982, 57-092230[U]; Oct. 29, 1982, 57-164779[U]

Int. Cl.³ A47L *13/24*

U.S. Cl. 15—147 R **5 Claims**



1. A mop comprising:

a shaft having a flange at both ends;

a bundle of strings having U-shaped bends extending about said shaft; and

a cover extending between said flanges and surrounding said strings to hold said strings about said shaft, said cover having a narrowed opening extending along said shaft, said strings extending outwardly through said opening, said opening having a pair of edges resiliently held against said strings on the opposite side of said shaft from said U-shaped bends.

4,486,913

FLOOR BRUSH CONSTRUCTION

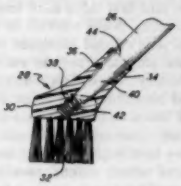
Matthew D. Kubick, Poland, N.Y., assignor to Perfex Corporation, Poland, N.Y.

Filed Sep. 27, 1982, Ser. No. 423,998

Int. Cl.³ A46B *15/00*

U.S. Cl. 15—159 R **2 Claims**

1. A floor brush comprising an elongated handle and a brush assembly connected to one end of the handle, the brush assembly including a unitary brush block of moldable material and fibers set in the block and projecting outwardly from one side thereof, the brush block having an integral socket projection in which said one end of the handle is received, the socket projection extending outwardly from the brush block at an oblique angle thereto on the side of the block opposite the fibers, the socket projection having a relatively long continuously tapered passage extending from its outer end inwardly, the smaller, inner end of the passage communicating with a shorter threaded passage of uniform diameter, the end of the handle that is received in the socket projection having a tapered portion conforming to the tapered socket passage, the tapered handle portion terminating at its smaller end in a shorter threaded portion that mates with the threaded socket passage, the engagement of the threaded portions of the handle and socket projection operating to draw the tapered portions thereof into intimate contact with one another whereby the stresses in this area of the floor brush are uniformly distributed over a relatively large area, the socket projection being dimensioned with respect to the handle so that it extends upwardly on the handle to a point where the handle is at its maximum diameter.



4,486,914

TOOTH BRUSH FOR CLEANING AND CARE OF THE TEETH

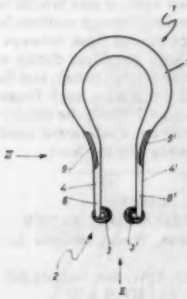
Staffan Plantèn, Parkstrasse 15, 7064 Remshalden-Buoch, and Torbjörn Askeroth, Gustav-Blickle-Strasse 9, 7472 Winterlingen, both of Fed. Rep. of Germany

Filed Mar. 8, 1983, Ser. No. 473,374

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1982, 3226656; Nov. 16, 1982, 8232150[U]

Int. Cl.³ A46B *00/00*

U.S. Cl. 15—167 A **15 Claims**



1. A tooth brush for effecting a cleaning of human teeth and a massaging of the gums, comprising:

a handle having a pair of arms extending coextensively with respect to each other and each thereof lying in a first common plane, mutually adjacent ends at one end on each arm terminating in an elongate brush member supporting

element extending outwardly of and on the same side of said first common plane;

means for facilitating a movement of said mutually adjacent ends toward and away from each other;

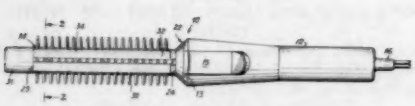
a pair of elongate brush members and coupling means for effecting a fixed coupling of each of said brush members to said brush member supporting elements, said brush members each extending outwardly of and on the same side of said first common plane, said brush members each having an elongate base with a first side oriented on said handle to face each other and a second side facing away from said first common plane, said first and second sides having a plurality of bristles emanating therefrom, said bristles emanating from said first sides each terminating in a first convex arcuate array when viewed in a direction along the longitudinal axis of said elongate base, axes of each said first convex arcuate array on each said base being oriented transversely of said first common plane and parallel to a second common plane defined by the longitudinal axes of said bases and which extends transversely of said first common plane, said bristles emanating from each said second sides terminating in a second convex arcuate array, the axes of which extend parallel to said second common plane, said bristles emanating from both said first and second sides terminating in a third convex arcuate array when viewed in a direction perpendicular to said second common plane, axes of said third convex arcuate array being oriented perpendicular to said second common plane.

4,486,915

FLOCKED HAIR BRUSH

James B. Stewart, Randolph, N.J., and Paul Bertelsen, Kalundborg, Denmark, assignors to Clairol Incorporated, New York, N.Y.

Filed Jan. 7, 1983, Ser. No. 456,206
Int. Cl.³ A46B *9/02*
U.S. Cl. 15—187 **8 Claims**



1. A hair brush comprising:

a handle portion; and

a tubular brushing portion extending from said handle portion and having a plurality of longitudinal bristles projecting therefrom, at least some of said bristles being suitable elongated for penetrating through multiple layers of hair, said brushing portion having flock between said bristles for contacting the outer hair layer during movement of said bristles through said layers of hair, said flock comprising a plurality of fine filaments, each filament having a length of less than about 2.5 mm, the density of the flock being sufficient to prevent a substantial number of layers of hair from penetrating into the flock.

4,486,916

PHONORECORD CLEANER

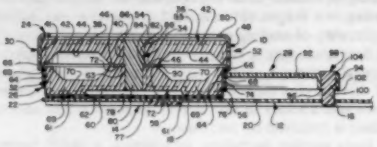
Ivor J. Allsop, Bellingham, Wash., assignor to Allsop, Inc., Bellingham, Wash.

Filed Oct. 15, 1981, Ser. No. 311,639
Int. Cl.³ G11B *3/58*
U.S. Cl. 15—246 **19 Claims**

1. A phonorecord cleaner for removing debris from a phonorecord having a radially extending recording band in the form of a spiral groove pattern, said cleaner comprising:

(a) handle means for grasping the phonorecord cleaner and moving same in an arcuate path around the recording band of a phonorecord; and,

(b) phonorecord contact means having a phonorecord contact face including a generally planar wiping surface, the transverse dimension of which is substantially equal to the radial dimension of said recording band to be cleaned,



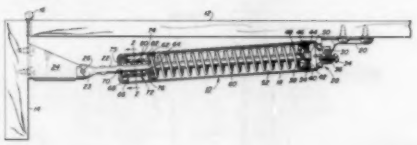
journalled about central axle means disposed along a coincident rotational axis generally normal to said contact face for relative rotational movement of said handle means with respect to said contact means.

4,486,917

DOOR CLOSER WITH A COMPRESSIBLE BRAKING SLEEVE

James R. Johnston, Sterling, and Cordell E. Meiste, Morrison, both of Ill., assignors to National Manufacturing Co., Sterling, Ill.

Filed Feb. 12, 1982, Ser. No. 348,608
Int. Cl.³ E05F *3/16*
U.S. Cl. 16—70 **7 Claims**



1. A door closer adapted to be mounted between a door member and a door frame member, comprising in combination

housing means adapted to be mounted to one of said door or door frame members and having a chamber therein,

piston means mounted for reciprocable movement between a first position and a second position in said chamber,

abutment means affixed to said housing,

elastomeric brake sleeve means mounted between said piston maans and said abutment, means,

spring means disposed between said piston means and one end of said brake sleeve means for longitudinally compressing said brake sleeve means against said abutment means as said piston means moves toward said second position and for biasing said piston means toward said first position,

rod means affixed to said piston means and extending through said brake sleeve means,

said rod means being adapted to be mounted to the other one of said members,

said rod means extending loosely through said brake sleeve means when said brake sleeve means is in a longitudinally unstressed condition and being frictionally engaged by said sleeve means when said brake sleeve means is longitudinally compressed, and

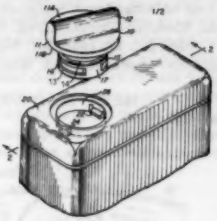
rigid sleeve means enclosing at least a portion of said brake sleeve means for restricting the radial expansion of said sleeve means when said sleeve means is longitudinally compressed between said spring means and said abutment means.

4,486,918

SNAP ACTION REMOVABLE KNOB

Douglas D. Peebles, Ft. Lauderdale, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 29, 1983, Ser. No. 489,892
Int. Cl.[3] B65D 25/28; B25G 1/00
U.S. Cl. 16—121 6 Claims



1. A knob assembly comprising:

a knob including a substantially cylindroidal shaft portion having a substantially circular groove therein, and first and second cams situated spaced apart in said groove by a predetermined angle therebetween,

a knob receiving member having upper and lower opposed surfaces including an aperture for receiving the shaft of said knob therein, and first and second flexible engaging means being situated extending into said aperture so as to engage said groove when the shaft portion of said knob is inserted in said aperture, said first and second engaging means being situated spaced apart in said aperture by an angle therebetween substantially equal to said predetermined angle,

whereby said knob is removable from said knob receiving member when said knob is appropriately rotated such that said first and second cams contact and push said first and second engaging means, respectively, out of said groove.

4,486,919

DOUBLE PIVOTING HINGE HAVING INTERCHANGEABLE BRACKETS

Ronald O. Schoenke, Milwaukee, Wis., assignor to Johnson Service Company, Milwaukee, Wis.

Filed Nov. 24, 1982, Ser. No. 444,463
Int. Cl.[3] E05D 3/06, 5/06
U.S. Cl. 16—366 2 Claims

1. A concealed hinge for pivotably supporting a door member in a generally edge-abutting and perpendicular relationship to a panel member and comprising:

an elongate generally planar body member having a longitudinal axis and having a first end with a first support flange laterally disposed adjacent thereto, a second end with a second support flange laterally disposed adjacent thereto and spaced from said first support flange;

said first support flange and said second support flange each including a planar door leg affixed to said body to define substantially a right angle therebetween and a planar panel leg affixed to said body to define an obtuse angle therebetween, wherein the legs extend outwardly from the same side of the elongate body member in a diverging direction;

each leg of said first support flange and said second support flange including means disposed at its outer terminus and adapted to be pivotably coupled to a bracket;

a panel bracket having planar spaced upper and lower extensions and being, coupled to a panel member and including means on said extensions for pivotable attachment to said panel legs along a first pivot axis, said first axis being spaced apart from the proximal edge of said panel member;

a door bracket having planar spaced upper and lower extensions and being, coupled to a door member and including means on said extensions for pivotable attachment to said door legs along a second pivot axis, said second axis being spaced apart from the proximal edge of said door member;

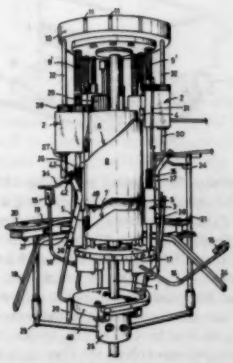
said hinge thereby being adapted to permit said door member to be opened by grasping at said door member proximal edge; said planar panel leg at the first end being longitudinally, outwardly spaced along the longitudinal axis from said planar door leg, and said planar door leg at the second end being longitudinally, outwardly spaced along the longitudinal axis from said planar panel leg to allow the panel bracket and the door bracket to be interchangable with each other.

4,486,920

METHOD AND APPARATUS TO CUT OUT THE VENT OF A BIRD

Rudolf J. Tieleman, Doesburg, and Jacobus E. Hazenbroek, Numansdorp, both of Netherlands, assignors to Tieleman B.V., Doesburg, Netherlands

Continuation of Ser. No. 160,623, Jun. 18, 1980, abandoned.
This application Sep. 7, 1983, Ser. No. 529,930
Claims priority, application Netherlands, Jun. 19, 1979, 7904778; Feb. 28, 1980, 8001202
Int. Cl.[3] A22C 21/06
U.S. Cl. 17—52 20 Claims



1. A method of removing the vent opening from a bird comprising supporting the bird by its legs in an inverted attitude, moving the bird against an upright compression plate

with the tail of the bird moving beneath a chest clip and the chest clip protruding between legs of the bird, moving the chest clip downwardly until the chest clip straddles the tail portion of the bird, urging the back of the bird against the compression plate, urging the tail of the bird toward the compression plate, moving a vacuum pipe with an open lower end downwardly until its opening engages the bird about its vent opening, moving the lower cylindrical cutting edge of a cylindrical knife downwardly in telescoping relationship with respect to the vacuum pipe to a level lower than the lower end of said vacuum pipe and rotating the cylindrical knife to cut out the vent opening of the bird, and inducing a pressure lower than atmospheric pressure in the vacuum pipe to exert a pulling force on the vent opening of the bird.

3. Apparatus to cut out the vent of a bird suspended by its legs in an inverted attitude on an overhead conveyor comprising positioning means movable laterally in timed relationship with a bird on the conveyor and movable vertically with respect to the bird, said positioning means including a chest clip for insertion between the legs of a bird, cam means for lifting said positioning means and for permitting said positioning means to move downwardly until the chest clip straddles the tail portion of the bird to support said positioning means on the bird, slide means positioned above said positioning means and movable vertically toward and away from said positioning means and supporting a vacuum pipe having a lower open end, means for guiding said slide means downwardly until the lower open end of said vacuum pipe engages the bird about its vent opening, and a cylindrical cutter movable in telescoping relationship and axially with respect to said vacuum pipe downwardly into engagement with the bird about its vent opening, said cylindrical cutter having a lower cutting edge which is downwardly movable to a level which is lower than the lower end of the vacuum pipe, and means for rotating said cylindrical cutter.

4,486,921

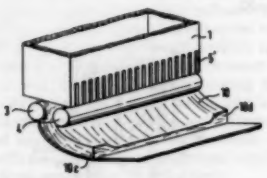
APPARATUS FOR PRODUCING A LAP FOR A CARDING MACHINE

Ferdinand Leifeld, Kempen, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Monchen-Gladbach, Fed. Rep. of Germany

Filed Jul. 28, 1983, Ser. No. 517,893

Int. Cl.³ D01G *15/40*

U.S. Cl. 19—105 **7 Claims**



1. In an apparatus for forming a fiber lap to be processed by a carding machine; said apparatus including a generally vertically oriented feed chute having generally parallel and vertically oriented front and rear walls, said chute having an opening at the top for receiving fiber tufts and an opening at the bottom for delivering a fiber lap; said feed chute having a width measured horizontally parallel to said walls and a depth defined by the distance between said walls; the fiber lap having a thickness determined by said depth; means for introducing a forced air stream into said chute for flow in the direction of the bottom thereof, and means for defining air exit openings in the zone of at least one of said walls allowing the air stream to leave the feed chute; the improvement wherein said depth measured at a height level of said air exit openings varies along said width for delivering a fiber lap of varying thickness along the lap width measured parallel to the width of the feed chute.

4,486,922

APPARATUS FOR SEPARATING IMPURITIES FROM FIBER MATERIAL

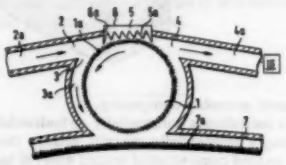
Berend J. Toevank, TL Losser, and Hendrik J. H. Hobbelt, BK Almelo, both of Netherlands, assignors to Trützschler GmbH & Co. KG, Monchen-Gladbach, Fed. Rep. of Germany

Filed Jul. 12, 1982, Ser. No. 397,403

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1981, 3127418

Int. Cl.³ D01G *9/12*

U.S. Cl. 19—200 **14 Claims**



1. Apparatus for separating impurities from fiber material, comprising: a cylinder provided on its circumference with clothing and connected to be rotated in a selected direction for gripping and transporting fiber material; means defining a feed device disposed for feeding fiber material containing impurities to said cylinder, said feed device cooperating with said cylinder to define a feed path presenting a constriction at the location of said cylinder; a blocking element disposed in said path at the location of said constriction opposite said cylinder for intercepting at least part of the fiber material; and means for delivering a stream of air and fiber material along said path toward said constriction to be intercepted by said blocking element, while said cylinder is rotating, for causing the fiber material to be gripped by said clothing, and causing the air to pass through said constriction and, with impurities removed from the fiber material, to flow through said blocking element and to be carried off from the region of said constriction.

4,486,923

CLOSURE DEVICE FOR BAGS OR POUCHES

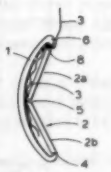
Peter J. Briggs, Sompting, England, assignor to Matburn (Holdings) Limited, London, England

Filed Aug. 31, 1979, Ser. No. 71,474

Claims priority, application United Kingdom, Sep. 7, 1978, 35902/78; Apr. 19, 1979, 7913729

Int. Cl.³ B65D *77/10*

U.S. Cl. 24—30.5 R **4 Claims**



1. A closure device operable between an open and a closed position for sealing a bag or a pouch comprising a first panel, a second flexible panel, a hinged connection between adjacent edges of said two panels, a lip at an end of said first panel in facing relationship to said hinged connection, a free end on said second panel opposite said hinged connection, said second panel having a dimension between said hinged connection and

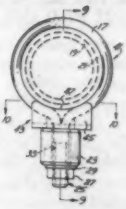
said free end which is greater than the distance between said hinged connection and the inside of said lip, said free end adapted to be received in tight abutting engagement with the inside of said lip when said closure device is moved to the closed position whereby said second panel is placed under stress, by reversing the position of its center relative to its ends, wherein said second panel has an intermediate hinge parallel to said hinged connection with said first panel and said second panel is movable about said hinges between an open position in which said intermediate hinge is remote from said concave face of said first panel and a closed position in which said intermediate hinge is adjacent said concave face of said first panel and said free edge of said second panel is engaged within said lip of said first panel, so that a portion of the bag or pouch positioned between the inside of said lip and said free edge of said second panel is sealed by the force exerted by said second panel against the inside of said lip.

4,486,924

SINGLE EYE CLAMP

Frank Sassak, Grand Rapids, Mich., assignor to McInerney Spring & Wire Co., Grand Rapids, Mich.

Filed May 9, 1983, Ser. No. 492,879
Int. Cl.³ B65D *63/02*; F16L *33/10*
U.S. Cl. 24—277 **2 Claims**



1. A single eye clamp adapted to receive a pipe or a pair of telescoped pipes comprising a circular ring body of circular cross-section;

end portions on said body being flattened upon one side, extending radially outward of said body with their flattened sides in engagement and threaded;

an apertured clamp anchor through which said flattened ends project, with said anchor abutting said ring;

said clamp anchor being an elongated sleeve of circular cross-section having a bore, at one end terminating in an outwardly tapered recess for cooperative registry with said ring at its junction with its end portions;

and a fastener threaded upon said ends in operative compressive engagement with said anchor adapted to peripherally contract said ring throughout 360°, securing said ring to said pipe;

said ring body and end portions being formed from a straight wire of circular cross-section.

4,486,925

FASTENING BUCKLE FOR CHAINS, STRINGS OF BEADS, PEARLS AND LIKE JEWELRY

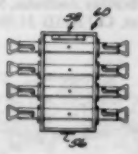
Patricia H. Lineberry, 1890 Edgecliff Dr., Fullerton, Calif. 92631

Filed Sep. 27, 1982, Ser. No. 424,015
Int. Cl.³ A44B *17/00*
U.S. Cl. 24—518 **15 Claims**

1. A buckle adapted for joining a plurality of strings of beads, pearls and the like in closed loops for decorative jewelry purposes, the buckle comprising:

a plurality of connecting members, each connecting member having two ends and means disposed substantially at each respective end for attaching one end of a string of beads to the respective end of the connecting member, each of said members being formed with external flange means, and

a substantially hollow member having an upper and a lower portion and means for hingedly connecting said upper and



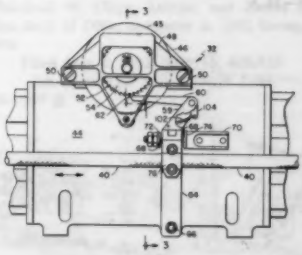
lower portions to one another, the hollow member including spacer means therein adapted to engage the external flanges of said connecting members for retaining the plurality of connecting members in the hollow member in substantially parallel spaced relationship to one another.

4,486,926

CARPET CUTTING DEVICE

Major B. Scruggs, LaGrange, Ga., and Robert C. Fay, Spartanburg, S.C., assignors to Milliken Research Corporation, Spartanburg, S.C.

Filed Dec. 2, 1982, Ser. No. 446,329
Int. Cl.³ D06C *13/10*
U.S. Cl. 26—13 **2 Claims**

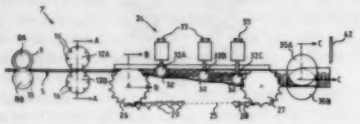


1. A cutter apparatus comprising: a fixed support member having a track therein, a sliding cutter means having means engaging said track to allow said cutter means to be slid in said track, a substantially cylindrical cutting blade fixed to said cutter means, a first means operably associated with said cutter means to slide said cutter means back and forth in said track and an indexing means connected to said cutter means to cause said cutting blade to be indexed upon being slid back and forth by said first means, said indexing mean including a ratchet wheel connected to said cutting blade and a pawl operably associated with said ratchet wheel, said indexing means also including a lever arm pivotally connected to said cutter means at one end and to said pawl at the other end, said indexing means including stop means located on both sides of said lever arm and connected to said cutter means to limit the pivotal movement of said lever arm to allow said pawl to index said cutting blade incrementally upon each complete reciprocation of said cutter means.

4,486,927
PRODUCTION OF EXPANDED METAL PARTS

Richard H. Hunter, and Karl Heins, both of New South Wales, Australia, assignors to Rondo Building Services Pty. Limited, New South Wales, Australia

Filed May 16, 1983, Ser. No. 494,627
Claims priority, application Australia, May 19, 1982, PF4070
Int. Cl.³ B21D *31/04*
U.S. Cl. 29—6.1 **6 Claims**

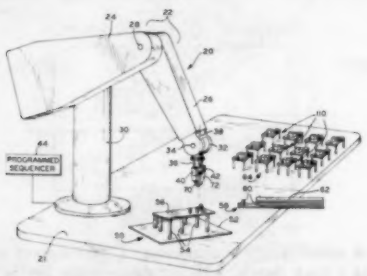


1. A method of producing expanded metal components by rolling-forming a metal strip, comprising continuously advancing said strip past cutting knives to provide parallel lines of longitudinal perforating slits in a web portion bounded by opposite lateral marginal portions, perforating said marginal portions at longitudinally spaced intervals and engaging projecting teeth on a chain conveyor with the perforations in each of said marginal portions during passage of said strip through an expansion station, progressively by a series by rollers forcing said web out of the plane of said marginal portions to effect expansion of said web as said strip is continuously passed through said station, and cutting the expanded strip to a desired length to form the expanded metal component.

4,486,928
APPARATUS FOR TOOL STORAGE AND SELECTION

Thomas L. Tucker, and Bill B. Clark, both of Fort Wayne, Ind., assignors to Magnavox Government and Industrial Electronics Company, Fort Wayne, Ind.

Filed Jul. 9, 1981, Ser. No. 281,584
Int. Cl.³ B23Q *3/157*
U.S. Cl. 29—26 A **17 Claims**

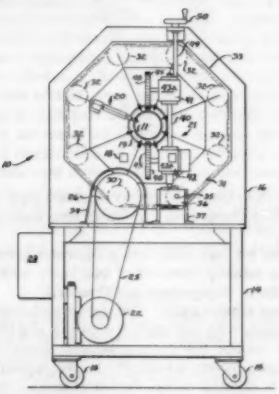


1. Apparatus for storing and holding tools comprising:
a work station;
a tool rest having a plurality of tool storage locations; said tool rest being stationary relative to the work station;
first means for transporting individual tools between a storage location in said tool rest and the work station;
said first means comprising second means for releasably attaching individual tools;
third means associated with said tool rest for releasably holding individual tools in said tool rest; said third means being operable in conjunction with said second means to release a tool from said tool rest prior to tool transport by said first means to the work station and for receiving and holding a tool in said tool rest after return by said first means to said tool rest;
said first means comprises an articulated arm having a plurality of connected arm segments;
said second means comprising a pair of jaws operably movable relative one another between open and closed positions, said jaws being supported at the distal end of a last arm segment;
said first means providing three dimensional movement of said arm to move said jaws between said tool rest and the work station and for opening and closing said jaws about a tool;
each tool has a pair of separable portions and each of said jaws has means for releasably attaching a separate tool portion whereby a jaw is releasably attachable to a tool portion prior to tool removal from said tool rest and detachable from the tool portion after return to the tool rest, so that the tool portions may be stored at a storage location when not in use and may be removed from the storage location, with a tool portion attached to each jaw, for three dimensional movement and for relative opening and closing between the tool portions.

4,486,929
TILE PERFORATING UNIT

Heinrich Dickhut, Chebanse, and Alfred Lilienthal, Bourbonnais, both of Ill., assignors to Cullom Machine Tool & Die, Inc., Cullom, Ill.

Filed Sep. 4, 1981, Ser. No. 299,228
Int. Cl.³ B23Q *5/22*; B26D *3/06*; B29C *17/10*
U.S. Cl. 29—33 T **13 Claims**



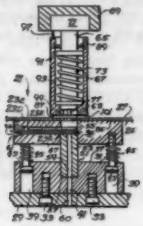
1. A perforating device for manufacturing water drainage openings through the wall of flexible hollow drainage tile, comprising:
a stationary frame having a support for a tile moving forwardly past the frame;
a perforator carriage carried on the frame with a harpoon-like tile wall piercing member directed toward said tile portion moving past said frame;
means interengaging said tile and carriage for allowing movement of the perforator carriage from an initial position forwardly along a path substantially parallel to forward movement of the tile during engagement of the piercing member with the tile so as to direct the piercing member to a single position on the tile;
driving means for reciprocating the piercing member into and out of the tile while the perforator carriage is following the advancing tile; and
means for biasing the perforator carriage rearwardly along the path to return the perforator carriage to the initial position immediately upon reciprocation of the piercing member out of the tile.

4,486,930

CUT-OFF FOR CLINCH NUT FEED

Kent D. Homfeldt, Elgin, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Oct. 25, 1982, Ser. No. 436,559
Int. Cl.³ B23P 11/00; F16B 39/282
U.S. Cl. 29—33 K 6 Claims



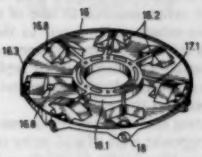
1. An apparatus for severing a lead nut having a hole therethrough from a linear arrangement of like attached nuts and for securing such a severed nut to carrier material comprising: linear arrangement support means for supporting said linear arrangement of attached nuts, including separate lead nut support means for supporting said lead nut; and means for moving said linear arrangement support means relative to said lead nut support means thereby severing said lead nut from the remainder of said linear arrangement of attached nuts and for drawing portions of said carrier material into said hole of said severed nut thereby securing said severed lead nut to said carrier material, means for advancing a punch toward said lead nut along a path, said punch having a tip oriented toward said hole of said lead nut, said carrier material being interposed between said punch and said lead nut; and, means for causing said punch tip to puncture said carrier material, said linear arrangement support means including a block of metal having first and second interconnecting passageways, said first passageway being oriented transverse to said path, said second passageway being oriented along said path, said linear arrangement of attached nuts being advanceable through said first passageway, inner surfaces of said first passageway being adapted to engage upper portions of said attached nuts carried therein; said separate lead nut support means includes a die insertable into said second passageway, said die having a cavity oriented along said path, said lead nut being advanceable through said first passageway and into said second passageway intermediate said punch and said die; and, said means for moving said linear arrangement support means relative to said lead nut support means and for drawing portions of said carrier material into said hole of said severed nut including a ram, a stripper and a fixed base which carries said die, said block of metal being biased away from said fixed base, said punch being biasly disposed within said stripper, said ram being adapted to advance said punch and said stripper along said path, to urge said stripper against said carrier material, to urge said block of metal along said path toward said base and to urge said inner surfaces of said first passageway against said upper portions of said attached nuts, portions of said inner surfaces of said first passageway adapted to engage edge portions of said lead nut and to sever said lead nut from the remainder of said attached nuts, said tip of said punch having three axially concentric cylindrical steps progressively decreasing to diameter away from said punch, whereupon when said ram is caused to urge said punch against said die said metal block severs said lead nut from said remainder of attached nuts, said punch tip punctures said carrier material and draws said portions thereof into said nut hole and said punch and said die cooperate to deform said lead nut supported therebetween thereby securing said lead nut to said carrier material.

4,486,931

SCARIFYING MACHINE

Franklin D. Pichelman, Minnetonka, and Perry M. Domaas, Brooklyn Center, both of Minn., assignors to Flo-Pac Corporation, Minneapolis, Minn.

Filed Aug. 27, 1982, Ser. No. 412,086
Int. Cl.³ B21C 43/00
U.S. Cl. 29—81 J 11 Claims



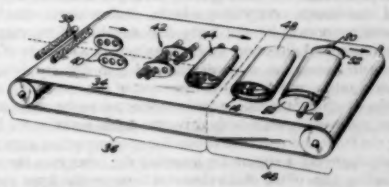
1. A scarifying machine including a generally horizontal, generally circular mounting plate laying primarily in a horizontal plane and rotatable about a generally vertical axis, a plurality of downwardly open, nonclogging wells formed in the mounting plate adjacent its periphery and extending above the plane, each well being defined and bounded by a pair of downwardly diverging, upwardly smoothly merging internal surfaces and a pair of opposed, generally vertical and parallel surfaces, scarifier means comprising a plurality of scarifying discs having abrading peripheries, and means for rotatably mounting the discs to the plate with the discs extending upwardly into the wells and downwardly beneath the mounting plate for contact with a floor, whereby floor debris is cleaned from the wells by rotation of the rotating discs therein and the circular mounting plate is positioned closely adjacent the floor to be cleaned.

4,486,932

PROCESS FOR MAKING A REPLACEMENT MUFFLER

James R. Hall, Toledo, Ohio; Donald P. Harter, Ottawa Lake, Mich.; Michael W. Clegg, Toledo, and James E. Gerber, Walbridge, both of Ohio, assignors to APX Group, Inc., Toledo, Ohio

Filed Aug. 6, 1982, Ser. No. 405,925
Int. Cl.³ B21D 53/00; F01N 1/00
U.S. Cl. 29—157 R 5 Claims



1. A process for producing a plurality of replacement mufflers which are adapted to replace a plurality of original equipment mufflers of various dimensions with substantially no modifications to the replacement mufflers after they have been manufactured, said process comprising:

(i) fabricating a plurality of replacement muffler bodies each of which comprises an outer casing and internal portions disposed therein, said replacement muffler bodies being substantially identical to one another but being dimensioned such that each said replacement muffler body only approximates the bodies of said original equipment mufflers;

(ii) fabricating a plurality of pairs of replacement muffler heads for mounting on opposed ends of said replacement muffler bodies, said replacement muffler heads each being

provided with a nipple aperture, said nipple apertures in selected pairs of said replacement muffler heads being at predetermined locations offset from each other by a distance substantially equal to the corresponding distance on a selected one of said original equipment mufflers;

(iii) fabricating a plurality of pairs of replacement muffler nipples with selected ones of said replacement muffler nipples having diameters substantially equal to the corresponding nipple diameters of said selected original equipment muffler and having lengths adapted to produce an overall length when secured to one of said replacement muffler bodies substantially equal to the corresponding length of said selected original equipment muffler;

(iv) fixedly securing each said pair of replacement muffler nipples to the corresponding replacement muffler heads at the nipple apertures thereof; and

(v) fixedly securing said selected replacement muffler heads to generally opposite ends of said outer casing of one said replacement muffler body to produce the replacement muffler.

4,486,933

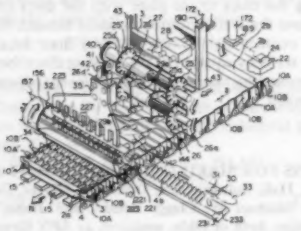
APPARATUS FOR ASSEMBLING CORE FOR HEAT EXCHANGER

Takatoshi Iwase, Anjo, and Akira Nakagawa, Kariya, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Oct. 26, 1982, Ser. No. 436,821

Int. Cl.³ B23D *15/26*

U.S. Cl. 29—157.3 A **26 Claims**



1. An apparatus for assembling a core for a heat exchanger having front and rear inserts, a predetermined number of tubes and fins which are alternatively arranged between the front and rear inserts, comprising a body, endless chain attachment means supported by the body and capable of moving in a predetermined direction, said means having a number of chain elements spaced at a predetermined gap for receiving the inserts, tubes, and fins in the direction of the movement of the chain attachment means, a drive connected to the chain attachment means to continuously drive the same, a station for inserting the front and rear inserts into the corresponding gaps of the chain elements, a station for inserting the tubes into the corresponding gaps of the chain elements between the front and rear inserts, and a station for inserting the fins between the front insert and the frontmost tube, between the adjacent tubes and between the rear insert and the rearmost tube, said stations being arranged along the direction of the movement of the chain attachment means.

4,486,934

MONOLITH EXTRUSION DIE CONSTRUCTION METHOD

James R. Reed, Flint, Mich., assignor to General Motors Corporation, Detroit, Mich.

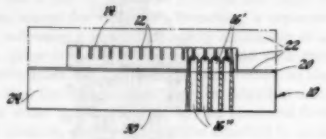
Filed Jan. 11, 1982, Ser. No. 338,434

Int. Cl.³ B23P *15/16*

U.S. Cl. 29—163.5 R **1 Claim**

1. A method of making a die plate for extruding honeycomb structures, said plate having sufficient thickness to withstand extrusion pressures and a plurality of extrudable material feed holes leading from the feed side of said die plate to intersecting die slots in the opposite discharge side of the plate, said slots defining the grid of said honeycomb, said method comprising

drilling a first set of feed holes into a first die plate, said holes being precisely located for introducing extrudable material into discharge slots to be formed in the opposite side of said plate, said holes being of shallow depth such that drill drift does not affect the accuracy of the intersection of a said hole with one or more said slots,



drilling a matching set of feed holes through a second die plate, the thickness of said die plate being as required to provide strength to said extrusion die without concern for feed hole drill drift, the location of said holes at the drill entry side of said second plate precisely corresponding to the location of said holes in said first plate,

bonding the two die plates together with the drill entry surfaces thereof in face to face relationship and with said holes in alignment to form a unitary plate,

and thereafter forming a grid of interconnected discharge slots in the unitary plate in the side opposite said feed holes and accurately intersected by said holes.

4,486,935

COIL SPRING COMPRESSOR FOR USE IN THE ASSEMBLY OF AUTOMOTIVE SUSPENSION SYSTEMS

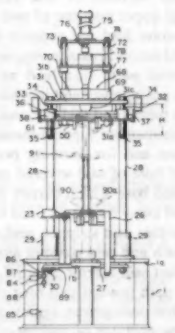
Hiroo Kashiwagi, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Feb. 23, 1983, Ser. No. 468,874

Claims priority, application Japan, Feb. 23, 1982, 57-024974[U]

Int. Cl.³ B23P *19/04*

U.S. Cl. 29—227 **3 Claims**



1. An improved coil spring compressor for use in the assembly of automotive suspension systems, said coil spring compressor being of the type including a base, a movable head plate positioned above said base for translational movement with respect to said base, means for driving said head plate toward and away from said base, a pair of spaced guide bars connected to and suspended from said head plate, a clamp carriage mounted on said guide bars for vertical sliding movement through a predetermined distance with respect to said head plate, said clamp carriage having a frontal opening of a

sufficient size not to contact with and interfere with a coil spring to be compressed, at least four clamping arms mounted on said clamp carriage with two of them positioned along one side of said frontal opening to form a pair and with the remaining two of them positioned along the other side thereof to form another pair, each of said clamping arms having an outer end pivoted to said clamp carriage and an inner end movable toward and away from the coil spring extending through said frontal opening, said two clamping arms in each pair being positioned fore and aft with each other with respect to the plane passing through the axes of said guide bars to form a front and rear clamping arms and interconnected with each other so that, on swinging one of said arms in one direction, the other arm swings conjointly therewith at an equal angle but in the opposite direction, at least four clamping hooks each mounted at the vicinity of said inner end of each clamping arms for engagement with the coil spring, and a pair of operating handles each of which is connected to each of said front clamping arms, the improvement wherein:

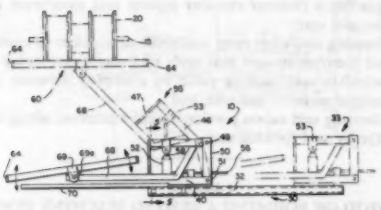
said pairs of clamping arms are interconnected with each other by means of a linkage so that on actuating any one of said operating handles, all the four clamping arms swing in concert at an equal angular movement toward and away from the coil spring.

4,486,936

APPARATUS FOR REMOVING A ROLLER OR WORKPIECE

Paul F. Curry, P.O. Box 775, Glade Spring, Va. 24340

Filed Oct. 2, 1981, Ser. No. 308,122
Int. Cl.³ B23P *19/04*
U.S. Cl. 29—252 **5 Claims**



1. An apparatus for laterally removing a workpiece from a space in a machine at rest about on a first level having limited vertical access comprising:

a base, including a base member, for stably supporting said apparatus at about said first level in a position laterally adjacent and remote from said workpiece, said base including stabilizing means extending from said base for stabilizing said apparatus as a cradle is raised or lowered, said stabilizing means including a frame member which is pivotable at least between a position forward of said base and lateral to said base;

a support member movably secured to said base member for movement relative to said base toward and away from said workpiece;

a rigid pivotable frame member pivotally secured to a portion of said support member;

a cradle member for receiving and supporting said workpiece, said cradle member being secured to said pivotable frame member to be raised and lowered as said pivotable frame is pivoted; and

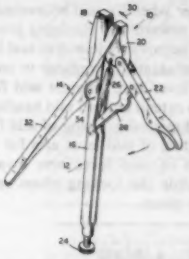
a force actuator supported by said base and connected to said rigid pivotable frame member for pivoting said pivotable frame member to raise and lower said cradle member as said force actuator is extended and retracted between its extended and stowed positions, and wherein said support member, said frame member, said cradle member, and said force actuator are movable toward and away from said workpiece on said base member relative to said base.

4,486,937

TOOL FOR REMOVING AUTOMOBILE PARKING BRAKE CABLE

Armando Teramo, 17 Oak Pl., Inwood, N.Y. 11696

Filed Apr. 13, 1982, Ser. No. 367,913
Int. Cl.³ B23P *19/04*
U.S. Cl. 29—268 **3 Claims**



1. The combination of

an automotive power brake cable assembly (**38, 40, 42, 44**) including a coiled spiral spring (**38**), a parking brake cable (**42**) surrounded by the coiled spiral spring, a cable end stop piece (**44**) and a channel element (**40**) forming part of an automotive parking brake lever of an automotive brake shoe assembly, the channel being fitted between the end stop piece (**44**) and an end portion of the coiled spiral spring

with

a one-hand operable automotive tool for releasing the channel of the parking brake lever by freeing said channel from the spring, and for reinstalling the parking brake cable on the parking brake lever,

wherein said tool comprises:

adjustable locking and gripping pliers (**12**), including a pair of adjustable clamping jaws (**18, 20**) movable in a first direction, said clamping jaws having serrated surfaces for engaging and locking onto said end stop piece (**44**) with said serrated surfaces contacting said end stop piece (**44**);

first and second handle members (**16, 22**) respectively extending from said clamping jaws and means (**24, 28**) on said pliers for setting and locking said clamping jaws in a locked position wherein said jaws close and fixedly lock on said end stop piece (**44**) of the parking brake cable without requiring a maintaining force between said handle members to maintain said locking of said clamping jaws on said end stop piece (**44**);

pivot means (**34**) fixedly mounted on said locking and gripping pliers (**12**); and

a prying device (**14**) having a lever arm (**32**) pivoted relative to one of said handle members (**16, 22**) via said pivot means (**34**) and extending substantially coplanar to said one handle member, a bifurcated generally pointed blade-like portion (**36**) at one end of said lever arm engageable with the spiral coils of the coiled spring and an operating portion at the other end of said lever arm on the opposite side of said pivot means (**34**) from said bifurcated portion (**36**), said operating portion of said lever arm being substantially aligned with at least one of said handle members (**16, 22**) so as to be one-hand operable with said at least one handle member, said bifurcated portion (**36**) being in proximity of said clamping jaws (**18, 20**) for penetrating a spiral coil of the coiled spring and engaging a spiral coil of the spring (**38**) while the spiral coil is under compression and for movement away from said clamping jaws in a direction substantially perpendicular to said first direction

when said operating portion of said lever arm (32) is manually pivoted toward said handle member (16) while said clamping jaws are locked onto said end stop piece (44) to separate said end stop piece (44) from said end of said spring (38) and permit movement of the channel (40) about the cable (42) free from pressure of the spring (38) without requiring a maintaining force between said handle members to maintain locking of said clamping jaws on said end stop piece;

a biasing means (35) interposed between said one of said handle members and said lever arm for normally urging said operating portion of said lever arm away from said one handle member whereby said bifurcated end portion is normally urged toward said clamping jaws,

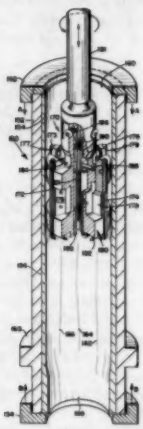
and a fixed arm (58) immovably joined to said locking pliers intermediate and substantially coplanar to said one handle member and said lever arm, wherein said fixed arm and said operating arm extend beyond said handle members to permit one-handed manual gripping of said fixed arm and said operating portion of said lever arm for pivoting said bifurcated portion of said lever arm away from said clamping jaws, while the locking pliers remain locked onto said end stop piece.

4,486,938

PROCESS OF REMANUFACTURING PUMP CYLINDER LINERS

Billy R. Hext, 1214 Terrace Cir., Odessa, Tex. 79761

Filed Mar. 20, 1981, Ser. No. 246,091
Int. Cl.³ B23P *7/02*; B22D *11/126*
U.S. Cl. 29—402.06 **42 Claims**



1. A process for remanufacturing a cylinder liner which is positioned in a drilling fluid pump during its period of use and which has a chrome iron alloy radial innermost layer therein; comprising the steps of:

procuring a used liner extracted from a pump cylinder in which the inner diameter is worn from the original liner inner diameter;

evaluating the inside cyclindrical surface condition of the liner to determine the thickness of metal to be removed from the inner surface;

aligning the axis of the liner after extraction from the fluid pump with the axis of a metal removal device;

removing portions of the chrome iron alloy inner surface of the liner by honing or grinding while outside of a pump cylinder to form a cylindrical inner surface in the liner with a diameter enlarged from the original liner inner diameter and finally sized to provide for contact with and reciprocation of a piston therein when said liner is positioned in a pump cylinder; and

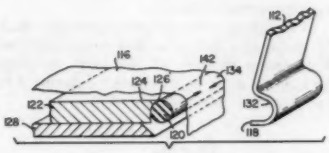
adding sufficient build-up metal to the exterior surface of the cylinder liner to permit a fitting relationship with the pump cylinder upon a determination that the liner outer surfaces have been worn sufficiently to interfere with the fit of liner into the pump cylinder.

4,486,939

METHOD AND APPARATUS FOR ATTACHING FLEXIBLE MEMBRANES TO A RIGID BACKING

Vytautas Kupcikevicius, Chicago, Ill., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Sep. 30, 1982, Ser. No. 430,229
Int. Cl.³ B21D *39/00*; B23P *19/02*
U.S. Cl. 29—509 **14 Claims**



1. A method of attaching a flexible membrane to a relatively stiff backing piece comprising the steps of:

(a) placing a portion of said flexible membrane into a seat which has been formed along an edge of said stiff backing piece with an excess portion of said membrane overhanging said edge;

(b) placing a resilient member against said membrane and into said seat;

(c) forming said edge over said resilient member to capture said member in said seat with said membrane being attached to said backing piece by clamping between said resilient member and seat; and

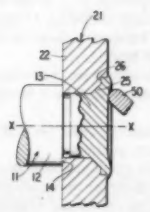
(d) shearing said excess portion of said membrane along said edge by said forming step.

4,486,940

METHOD OF FORMING A SEWING MACHINE HOOK ASSEMBLY

Giuseppe Valori, Monza; Marco Primati, Cinisello Balsamo, both of Italy, and Victor G. Stevens, Westfield, N.J., assignors to The Singer Company, Stamford, Conn.

Filed Nov. 18, 1982, Ser. No. 442,540
Int. Cl.³ B21D *39/00*; B23P *11/00*
U.S. Cl. 29—509 **2 Claims**



1. The method of forming a sewing machine rotary hook and hook shaft assembly comprising:

machining a hook shaft with a shouldered extremity,

forming a hook body by a powdered metal sintering process, said hook body including a flared seat from accomodating said shouldered shaft extremity,

separately heat treating to harden said sintered hook body and said machined hook shaft maintaining said shouldered hook shaft extremity in substantially unhardened condition,

assembling said hook shaft shouldered extremity within the flared seat of said hook body, and

deforming said shouldered extremity of said hook shaft into gripping relation within the flared seat of said hook body by an orbital rivet setting process.

4,486,941

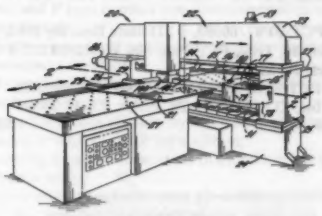
PUNCH PRESS WITH AUTOMATIC TOOL CHANGER

William B. Scott, Rochelle; Daniel C. Dickinson, Pecatonica, and Joel C. E. Arnesson, Rockford, all of Ill., assignors to W. A. Whitney Corp., Rockford, Ill.

Division of Ser. No. 299,391, Sep. 4, 1981, Pat. No. 4,423,546. This application Aug. 1, 1983, Ser. No. 519,414

Int. Cl.³ B23Q *1/55*

U.S. Cl. 29—568 4 Claims



1. A punch press comprising a support, a vertically reciprocable ram, a tool holder on the lower end of said ram and having an opening for receiving a punch, a die holder spaced below said tool holder and having means for supporting a die, said die holder having a slug opening extending therethrough, a tool magazine on said support and releasably holding a plurality of tool sets each comprising a punch and a vertically alined die adapted to coact with one another to form a hole in a workpiece, said magazine also releasably holding a dummy set comprising a first shield adapted to cover the opening in said tool holder and further comprising a second shield adapted to cover said die holder and close off said slug opening, means for moving said magazine on said support to advance any selected one of said sets to a tool changing station, means selectively operable to cause the set in said tool changing station to be transferred from said magazine to said tool and die holders and then subsequently back to said magazine, a housing fixed to said support and enclosing said magazine, an access opening in said housing at said tool changing station and exposing the set at said tool changing station, and shield means carried by and movable with said magazine, said shield means being located adjacent the home of said dummy set and being operable, when said home is in said tool changing station, to close off said access opening and protect said tool sets of said magazine from foreign material entering into said housing through said access opening.

4,486,942

METHOD OF MANUFACTURING SEMICONDUCTOR INTEGRATED CIRCUIT BI-MOS DEVICE

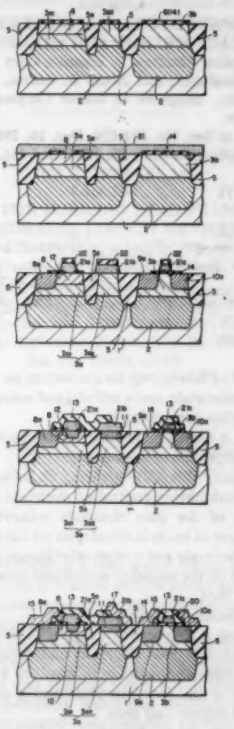
Tadashi Hirao, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 348,541, Feb. 12, 1982, Pat. No. 4,445,268. This application Mar. 24, 1983, Ser. No. 478,590

Claims priority, application Japan, Feb. 14, 1981, 56-20351; Mar. 5, 1981, 56-32981

Int. Cl.³ H01L *21/76, 21/441*

U.S. Cl. 29—571 6 Claims



1. A method of manufacturing a BI-MOS semiconductor integrated device comprising:

masking an epitaxial layer of a silicon substrate;

selectively oxidizing said epitaxial layer to form a first oxide film whereby element forming regions are defined and electrically isolated from one another in a pattern as defined by said masking;

diffusing an impurity of a first dopant type into one of said element forming regions, forming a base of said first dopant type;

forming a second oxide film onto said epitaxial layer;

removing said second oxide film at predetermined points corresponding with points of emitter and collector electrode contact with outside electrical leads;

forming a silicon film of a second dopant type onto said epitaxial layer;

masking and etching said silicon film, whereby emitter, collector and gate electrodes are formed of said second dopant type;

diffusing impurities of said first dopant type into unmasked portions of said epitaxial layer, whereby base contact

source and drain layers are formed which are of said first dopant type;

annealing said epitaxial layer, whereby said emitter and collector electrodes diffuse into said element forming regions beneath them; and

providing insulation and electrical contact means to electrically address said element forming regions.

4,486,943

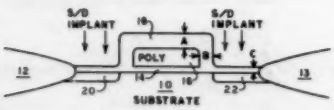
ZERO DRAIN OVERLAP AND SELF ALIGNED CONTACT METHOD FOR MOS DEVICES

William D. Ryden; Matthew V. Hanson; Gary F. Derbenwick; Alfred P. Gnadinger, and James R. Adams, all of Colorado Springs, Colo., assignors to Inmos Corporation, Colorado Springs, Colo.

Continuation of Ser. No. 331,474, Dec. 16, 1981, abandoned. This application Mar. 12, 1984, Ser. No. 588,000

Int. Cl.³ H01L *21/265*

U.S. Cl. 29—571 **18 Claims**



1. A method of fabricating on a substrate an MOS transistor having a gate electrode and a self-aligned source/drain region with zero overlap comprising:

(a) forming a doped polysilicon gate electrode upon but insulated from the substrate; then

(b) differentially thermally growing an oxide to serve as an implant mask having controlled thickness on both the top and sides of the gate electrode whereby a relatively thicker layer of oxide is developed on the top and sides of the gate electrode and a relatively thinner layer of oxide is developed on the intended source and drain regions of the substrate; then

(c) anisotropically etching said oxide;

(d) implanting a source/drain region in the substrate such that said implant mask shields an underlying portion of the substrate from implantation to result in a gap between a side edge of the gate electrode and a side edge of the implanted region; and then

(e) heat driving the implanted source/drain region until its side edge is substantially aligned with the previously separated side edge of the gate electrode, whereby the source/drain edge is aligned with the gate electrode edge and there is substantially zero overlap.

4,486,944

METHOD OF MAKING SINGLE POLY MEMORY CELL

Kim C. Hardee, Manitou Springs, Colo., assignor to Inmos Corporation, Colorado Springs

Division of Ser. No. 164,285, Jun. 20, 1980,. This application Apr. 18, 1983, Ser. No. 485,732

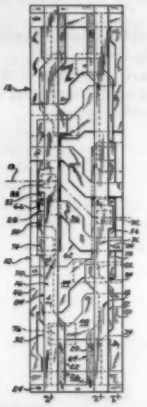
Int. Cl.³ H01L *21/80*

U.S. Cl. 29—577 C **8 Claims**

1. A method for fabricating a bistable flip-flop memory cell having a pair of transfer transistors and a pair of driver transistors on a wafer of semiconductor material, including the steps of:

doping to form a buried ground line beneath the surface of substrate portion of the wafer;

depositing only a single layer of polycrystalline silicon ("poly") on the wafer crossing over conductive regions in the substrate;



establishing insulation between the polysilicon and a metal layer to be established subsequently; and

establishing metal data lines for the memory cell.

4,486,945

METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE WITH PLATED BUMP

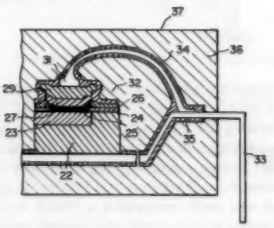
Seiichiro Aigoo, 15-13, Negishi 3-chome, Taito-Ku, Tokyo 110, Japan

PCT No. PCT/JP81/00093, § 371 Date Dec. 16, 1982, § 102(e) Date Dec. 16, 1982, PCT Pub. No. WO82/03727, PCT Pub. Date Oct. 28, 1982

PCT Filed Apr. 21, 1981, Ser. No. 456,081

Int. Cl.³ H01L *21/28, 21/44, 23/28, 29/40*

U.S. Cl. 29—588 **18 Claims**



1. A method of manufacturing a semiconductor device with plated bumps, the steps comprising:

a first step in which an insulation film with openings at bump formed positions is applied on a semiconductor wafer having aluminium wiring thereon,

a second step in which a plating ground metal layer is formed on said insulation film,

a third step in which a photo resist layer with openings at the bump formed positions is masked over said plating ground metal layer,

a fourth step in which a metal which is easily bondable with drawn out leads is plated at the bump formed positions on said plating ground metal layer to form bumps,

a fifth step in which said photo resist layer and said plating ground metal layer located at those positions other than the bump formed positions are removed to complete a semiconductor chip,

a sixth step in which drawn out leads are bonded to said bumps on said semiconductor chip to complete a semiconductor bump chip,

a seventh step in which said semiconductor bump chip is bonded to a connecting device,

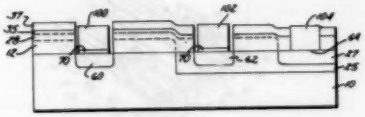
an eighth step in which said semiconductor bump chip and the part of the connecting device to which it is bonded is passivation-treated using passivation glass.

4,486,946

METHOD FOR USING TITANIUM-TUNGSTEN ALLOY AS A BARRIER METAL IN SILICON SEMICONDUCTOR PROCESSING

Walter H. Jopke, Jr., Bloomington, and John S. Shier, Apply Valley, both of Minn., assignors to Control Data Corporation, Minneapolis, Minn.

Filed Jul. 12, 1983, Ser. No. 513,208
Int. Cl.³ H01L *21/281*
U.S. Cl. 29—590 **3 Claims**



1. A method for selectively applying barrier metal to the surface of a NPN type semiconductor wafer, comprising the steps of:

(a) processing the silicon wafer to produce an NPN transistor device having emitter contact windows exposed to N type silicon, collector contact windows exposed to N type silicon, and P type contact windows covered by a layer of silicon dioxide;

(b) depositing a layer of an alloy of titanium-tungsten on the semiconductor surface;

(c) etching the titanium-tungsten layer out of the P type contact windows;

(d) etching the silicon dioxide layer out of the P type contact windows to expose the P type silicon;

(e) depositing a metalization layer of aluminum on the semiconductor wafer;

(f) using conductor interconnect photolithography to etch away the undesired portions of the aluminum layer to define the aluminum signal lines; and

(g) etching away those portions of the titanium-tungsten layer not covered by the aluminum signal lines whereby titanium-tungsten provides a barrier metal between the aluminum signal lines and the silicon of the N type emitter and collector contact windows, and wherein the aluminum signal lines connect directly to the P type silicon contact windows.

4,486,947

APPARATUS FOR COILS IN LENGTHY CORES

Robert G. Walker, Ossian, Ind., assignor to Industra Products, Inc., Fort Wayne, Ind.

Filed Sep. 13, 1982, Ser. No. 417,414
Int. Cl.³ H02K *15/06*
U.S. Cl. 29—734 **8 Claims**

1. A coil placing machine comprising:

an elongated machine bed;

a stator support cradle movable along the bed;

a generally cylindrical tooling enclosure fixed relative to the bed and generally axially aligned with the direction of the cradle movement;

coil placer tooling having a home position within the enclosure and extending somewhat therefrom toward the cradle;

a first fluid actuated cylinder fixed relative to the bed for moving the tooling from the enclosure toward the cradle and back to its home position; and

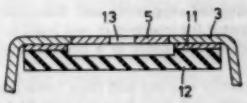
a second fluid actuated cylinder movable generally with the tooling and actuable to impart additional movement to a portion of the tooling relative to the remainder of the tooling.

4,486,948

METHOD FOR FORMING LEAD FRAME FOR INTEGRATED CIRCUIT DEVICES

Hiroshi Chiba, and Shoichi Ogura, both of Tokyo, Japan, assignors to Nippon Electric Co., Ltd. and Sumitomo Metal Mining Company Limited, both of Tokyo, Japan

Division of Ser. No. 293,130, Aug. 17, 1981, Pat. No. 4,415,917.
This application Jun. 22, 1983, Ser. No. 506,798
Claims priority, application Japan, Aug. 20, 1980, 55-114185
Int. Cl.³ H01R *43/00*
U.S. Cl. 29—827 **3 Claims**



1. A method of forming a lead frame whose lead elements are protected against unwanted deformations, said lead frame being useful in the manufacture of an integrated circuit device, said method comprising the steps of

(1) providing a unitary structure which includes two spaced apart support strips, a central body member located generally between said support strips, and a plurality of lead elements respectively extending between said support strips and said central body member, the outer ends of said lead elements being integrally connected to a respective one of said support strips and the inner ends of said lead elements being integrally connected to said central body member along its periphery,

(2) servering a portion of said central body member from said lead elements so as to provide a body element whose periphery includes recesses formed therein at locations where the inner ends of said lead elements were previously connected to said central body member and a lead frame whose lead elements include inner ends having extended tips, said extended tips comprising the respective portions of the periphery of said body element which have been removed to provide the recesses in the periphery of said body element,

(3) moving said body element in a first direction with respect to said lead frame so as to separate the recesses in the periphery of said body element from the extended tips of said lead elements of said lead frame, and

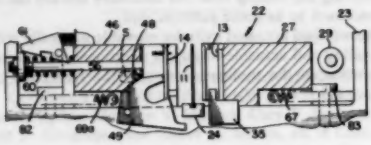
(4) moving said body element in a second direction opposite to said first direction so as to reposition the recesses in the periphery of said body element around the respective extended tips of the lead elements of said lead frame, thus acting to protect them from unwanted deformations.

4,486,949

APPARATUS AND PROCESS FOR INSTALLING IDC CONNECTORS ONTO A RIBBON CABLE

William Allen, Stratford, Conn., assignor to Burndy Corporation, Norwalk, Conn.

Filed Sep. 30, 1982, Ser. No. 431,917
Int. Cl.³ H01R *43/04*; B23P *19/00*
U.S. Cl. 29—861 **17 Claims**



1. A process for assemblying a multi-pin connector to a ribbon-type cable, said connector comprising a connector body including a plurality of contact pins and a cover member secured to said connector body, said cable, as assembled, being sandwiched between said cover and said body so that wires in said cable are electrically connected to desired ones of said pins; said process comprising:

(a) providing a first assembly ram including a recess for receiving and supporting said cover member;

(b) providing a second assembly ram including a plurality of holes arranged for receiving said pins of said connector body;

(c) receiving and supporting said cover member in said recess;

(d) receiving and supporting said connector body with said pins oriented for insertion in said holes in said second ram;

(e) supporting said cable in a desired orientation between said ram;

(f) concurrently moving said rams toward said cable so that said second ram first engages said first connector body and imbeds said pins in said holes and continuing to move said rams until said cover member and said connector body engage each other and are secured together with said cable sandwiched therebetween;

(g) moving said rams away from each other and away from said cable to disengage said rams from said multi-pin connector; and

(h) extracting said multi-pin connector from said second ram as said second ram moves away from said first ram.

4,486,950

METHOD OF MAKING TWO ROW ELECTRICAL CONNECTOR

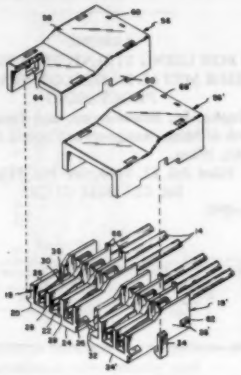
Charles H. Weidler, Lancaster, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 189,532, Sep. 22, 1980, Pat. No. 4,354,719. This application Aug. 12, 1982, Ser. No. 407,381
Int. Cl.³ H01R *43/04*
U.S. Cl. 29—866 **6 Claims**

1. A method of manufacturing a two-row electrical connector adapted to be mated with a complementary two-row electrical connector of the type comprising an insulating housing having a mating face and a wire entry face, said faces being oppositely directed, spaced-apart endwalls and spaced-apart sidewalls extending between said faces, a plurality of terminal-receiving cavities extending through said housing from said wire entry face to said mating face and a contact terminal in each of said cavities, said cavities and said terminals being arranged in two parallel rows which extend between said endwalls, said method comprising the steps of:

positioning a pair of connector modules, of the type having a single row of terminals therein, in side-by-side relationship with the terminals in the two modules arranged as a single row,

locating a plurality of wires in side-by-side relationship in a single plane with each wire in alignment with one of said terminals,



moving said wires laterally to their axis in a single direction to the terminals and connecting said wires to said terminals, subsequently,

positioning said modules against each other in aligned relationship and with said terminals in said modules forming two parallel rows and with all terminals having the same orientation, and

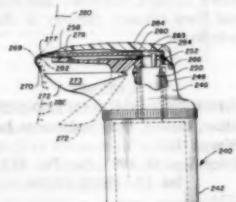
securing said modules to each other thereby forming a wired two-row electrical connector.

4,486,951

IMPROVEMENT IN BLADE SYSTEMS FOR SHAVING APPARATUS

Martin N. Leibowitz, 1155 Hillsboro Mile, Suite 602, Hillsboro Beach, Fla. 33062

Filed Sep. 3, 1982, Ser. No. 414,615
Int. Cl.³ B26B *21/38*
U.S. Cl. 30—45 **3 Claims**



1. A shaving apparatus, comprising:

a blade having at least one elongated cutting edge and being secured to a blade support member having a groove extending perpendicular to said cutting edge;

a housing having a motor disposed therein and drivably connected to said blade for effecting reciprocation of said

blade substantially parallel to its cutting edge to effect a slicing type of shaving action;

a head member disposed on said housing and having a channel formed therein for receiving and supporting said blade support member for reciprocation in said channel;

a rotary shaft of said motor including an eccentric pin disposed in said groove and drivably connected to said blade support member for reciprocating said blade support member and said blade;

a cover supported on said head member for preventing direct engagement of said blade with a surface to be shaved, said cover including a plurality of spaced apart comb teeth formed along one edge of said cover and extending across said cutting edge of said blade and providing spaces between adjacent ones of said teeth for guiding hairs to be presented to said blade for being cut by a slicing action.

4,486,952

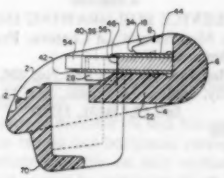
SHAVING IMPLEMENT

Robert A. Trotta, Pembroke, Mass., assignor to The Gillette Company, Boston, Mass.

Continuation of Ser. No. 298,727, Sep. 3, 1981, abandoned, which is a continuation-in-part of Ser. No. 194,551, Oct. 6, 1980, Pat. No. 4,354,312. This application Oct. 11, 1983, Ser. No. 540,657

Int. Cl.³ B26B *21/22*

U.S. Cl. 30—47 **1 Claim**



1. A shaving implement comprising a platform portion provided with a series of spaced rib portions defining recesses therebetween, a back portion upstanding from a lengthwise margin of said platform portion, a cap portion comprising a series of spaced forwardly extending fingers extending from said back portion and overlying said platform portion, each of said fingers being disposed over one of said recesses, end walls interconnecting said platform and cap portions at either end thereof, said platform, back, cap and wall portions being an integrally molded plastic unit, said cap portion fingers being adapted, in an unstressed state, to incline toward said platform portion to a first position, and blade means physically distinct from said plastic unit and permanently disposed between said cap and platform portions and adjacent said back portion, said blade means comprising a first blade member, a spacer member, and a second blade member, said spacer member being disposed between said first and second blade members, said blade and spacer members being in abutting engagement, said blade means stressing said cap portion fingers and retaining said cap portion fingers in a second position further removed from said platform portion than said first position, said cap portion thereby exercising a clamping compressive pressure on said blade means, said blade means being held together in said compressive abutting relationship by said clamping pressure but otherwise being unconnected.

4,486,953

CHAIN SAW BAR WITH AUTOMATIC TENSIONING

James E. Halverson, Rte. One, Box 40, Hillsdale, Wis. 54744

Continuation-in-part of Ser. No. 209,754, Nov. 24, 1980, Pat. No. 4,361,960. This application Jun. 29, 1982, Ser. No. 393,328

Int. Cl.³ B27B *17/12*

U.S. Cl. 30—385 **8 Claims**

1. A bifurcated chain saw guide bar, comprising:

(a) an elongate primary guide bar member longitudinally extending between a proximal end configured for mounting to a chain saw frame, and an oppositely disposed distal end; said primary guide bar defining an internal cavity having an access port thereto formed through said distal end;

(b) a nose guide member configured to form an operative extension of said primary guide bar member;

(c) connecting means for mounting said nose guide member to said primary bar member adjacent said distal end thereof such that said primary and said nose guide members are generally coplanar and peripherally define in combination a guide path for an articulated endless cutting chain; said connecting means including a bar member operatively connected to said nose guide member and extending within said internal cavity through said access port thereof; and

(d) damping means adjacent the distal end juncture of said primary guide bar member with said nose guide member for absorbing force components transmitted through said primary guide bar member in a direction transverse to the longitudinal direction of said primary guide bar and in a transverse direction between said connecting bar member and said primary guide member, said damping means being formed in part from that portion of said primary guide bar member forming at least one of the outer peripheral walls of said internal cavity.

4,486,954

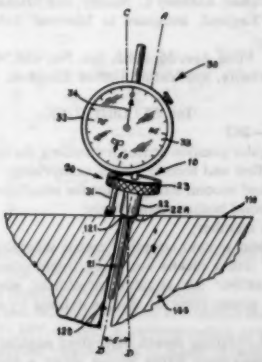
HOLE ANGULARITY INSPECTION DEVICE

William L. Mock, 8832 Mohawk Way, Fair Oaks, Calif. 95628

Filed Jul. 27, 1981, Ser. No. 286,928

Int. Cl.³ G01B *5/00*

U.S. Cl. 33—174 Q **1 Claim**



1. A device for measuring the perpendicularity and angular-

ity of the centerline of a straight-walled hole having a diameter in the range of from ¼ inch to ¾ inch in a workpiece with respect to a planar surface of said workpiece, wherein said hole has an entrance in said surface, said device comprising:

a. means for following angular displacement of said centerline of said hole with respect to said planar surface, wherein said means includes

(1) a probe member, said probe member having a first end and a second end and being of a rod-like shape having a hollow longitudinally extending portion therein, the interior wall of said probe member surrounding said hollow portion being threaded and defining a female portion, a longitudinally extending element located within said hollow portion of said probe member and having a truncated cone-like configuration adjacent said first end of said probe member and a rod-like configuration for its remaining length and having external threads thereon and defining the male portion, wherein the external size of said first end of said probe member can be adjusted by rotating said longitudinally extending element within said probe member, and said first end of said probe member capable of being inserted into said hole so as to have a snug fit;

(2) a rotatable shaft member, said shaft member having a flat first end larger than said entrance opening of said hole, disposed external of said hole, and positioned such that it is in contact with said surface, and a second end with a collar, wherein said first end of said shaft member is fixedly connected in coaxial relationship to said second end of said probe member wherein said probe member rotates with said rotatable shaft member; and

b. means for indicating and measuring said followed angular displacement of said centerline, said indicating and measuring means including a plunger housing, a plunger which is vertically movable with respect to said plunger housing and with respect to said planar surface, and a dial indicator operably connected to said plunger and actuated by said vertical movement thereof, said plunger being in contact with said surface, and also being disposed in parallel, spaced-apart relationship with said probe member, and wherein said plunger housing operably connects said indicating and measuring means to said collar of said shaft member;

whereby shen said shaft member is rotated, said dial indicator indicates and measures perpendicularity or any angular displacement of said centerline with respect to said planar surface of said workpiece.

4,486,955

ANGULAR POSITION SENSORS

Jeremy F. Fisher; Anthony C. Mundy, and Michael J. Perry, all of Kent, England, assignors to Marconi Avionics Limited, England

Filed Apr. 26, 1983, Ser. No. 488,747

Claims priority, application United Kingdom, Apr. 28, 1982, 8212310

Int. Cl.³ G01C *1/08*

U.S. Cl. 33—262 **13 Claims**

1. An angular position sensor for sensing the relative angular position of first and second bodies comprising:

(A) first and second fixing means for attachment to said first and second bodies respectively;

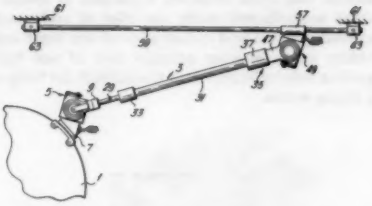
(B) a link member;

(C) first and second coupling means whereby the first and second fixing means are respectively connected to said link member for angular movement about respective spaced points lying on an axis defined by said link member,

(i) each coupling means permitting angular movement of the associated fixing means about a first axis passing through the associated said point and transverse to said axis defined by the link member and a second axis passing through the associated said point and transverse to and rotatable about said first axis;

(D) first and second angle sensing means each of which is associated with a respective one of said first and second coupling means and produces outputs which are respectively representative of the angular position of the associated fixing means about the associated said first and second axes;

(i) third coupling means whereby said first and second fixing means may be moved translationally in at least



one direction with respect to one another without altering any of the outputs of said angle sensing means;

(E) fourth coupling means in said link member permitting relative angular movement of said first and second fixing means about the axis defined by said link member; and

(F) a third angle sensing means associated with said fourth coupling means which produces an electrical output which is representative of the relative angular position of said first and second fixing means about said axis defined by said link member.

4,486,956

CONTROL DEVICE FOR DRAWING INSTRUMENTS

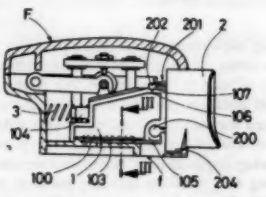
Alain Bruneau, Montferrand Le Chateau, France, assignor to Alpia S.A., Besancon, France

Filed Jan. 10, 1983, Ser. No. 456,839

Claims priority, application France, Jan. 11, 1982, 82 00281

Int. Cl.³ B43L *13/08*

U.S. Cl. 33—438 **5 Claims**



1. A device for controlling a mechanism for setting the angular position of a pair of rules extending from a head of a drawing apparatus, which comprises a slider mounted within a portion of the head rotating with the rules which comprises means for guiding the movements of translation of said slider, said means comprising a T-section member having a web and two lateral wings and being secured to the base of said slider, and a slideway secured to said head and slidably engaged by said T-section member, said slider being connected through pivot means to a thumb-piece accessible from the exterior of the head and means for locking said thumb-piece wherein said pivot means interconnecting said slider and said thumb-piece comprises a ball rigid with said thumb-piece and engaged in a socket-forming cavity of said slider which is located adjacent their area of mutual contact, slightly above said T-section member.

4. A device for controlling a mechanism for setting the angular position of a pair of rules extending from a head of a drawing apparatus, which comprises a slider slidably mounted within said head and movable between a locking position in which said pair of rules is held against rotation and a released position in which said pair of rules is released for rotation, spring means biasing said slider toward locking position, a thumb-piece pivotally connected to said slider for moving said slider against the action of said spring means from locking position to released position, and a projecting portion on said thumb-piece engageable in a recess in a base portion of said head, said thumb-piece being pivotally movable, when said slider is in released position, to bring said projecting portion into engagement in said recess to hold said slider in said released position.

4,486,957

DRAWING MACHINE CARRRIAGE

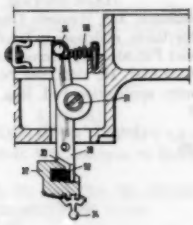
Heinrich Otten, Wilhelmshaven, Fed. Rep. of Germany, assignor to Franz Kuhlmann Praezisionsmechanik und Maschinenbau GmbH & Co. KG, Wilhelmshaven, Fed. Rep. of Germany

Filed Jan. 24, 1983, Ser. No. 460,486

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1982, 3202234; Jan. 25, 1982, 3202243

Int. Cl.³ B43L *13/02*

U.S. Cl. 33—438 **18 Claims**



1. A drawing machine carriage assembly comprising:
a horizontal guide rail;
a horizontal carriage movable on said horizontal guide rail;
a vertical guide rail on said horizontal carriage;
a vertical carriage movable on said vertical guide rail, a drawing head carried by said vertical carriage;
brake means for holding the horizontal carriage;
an operational element which activates said brake means;
a transmission including a rotatably mounted rod operatively coupling said operational element and said brake means, the operational element causing the rod to shift the brake means out of the neutral position into a releasably retained braking position; and
retainer means for releasably securing the braking means in its braking position and for simultaneously releasing stress from the rod and the operational element, the operational element and the transmission being relieved of stress in the neutral position and in the braking position for free movement of the operational element along the rod.

4,486,958

DRAWING HEAD

Uwe Jopt, Wilhelmshaven, Fed. Rep. of Germany, assignor to Franz Kuhlmann Prazisionsmechanik und Maschinenbau GmbH & Co. KG, Wilhelmshaven, Fed. Rep. of Germany

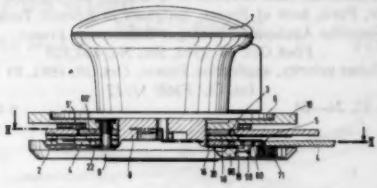
Filed Feb. 23, 1983, Ser. No. 468,964

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1982, 3206549

Int. Cl.³ B43L *13/02*

U.S. Cl. 33—438 **18 Claims**

1. A drawing head for a drawing machine, comprising:
a base plate which has a central bore and which is adapted for being nonrotatably mounted to the drawing machine;
a pin within the central bore;
a straightedge support assembly including a straightedge support, the assembly mounted on the pin in the central bore;
an upper cover plate nonrotatably mounted on the pin, the cover plate having a gripping knob;
a spacing ring rotatably mounted between the base plate and the cover plate to turn about the central axis of rotation;
first locking means for releasable retention of the straightedge support assembly with respect to the spacing ring; and



second locking means for releasable retention of the spacing ring with respect to the base plate;
each of the first and second locking means including a locking pawl having a locking tooth, a pivot jaw, and a locking disc, the locking pawl being pivotally supported about an axis parallel to the central axis of rotation by means of the pivot jaw, the locking pawl locking and unlocking by means of the locking tooth being spring-biased against the locking disc which is secured to the spacing ring;
a recess being provided in the straightedge support assembly or the base plate adjacent to the corresponding locking disc, the locking pawl being positioned in the recess;
the locking means also including a pivot pin which projects radially into the pivot jaw.

4,486,959

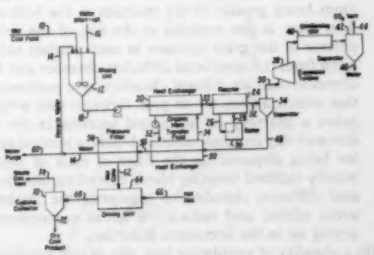
PROCESS FOR THE THERMAL DEWATERING OF YOUNG COALS

Tsuan Y. Chang, Baldwin, N.Y., assignor to The Halcon SD Group, Inc., New York, N.Y.

Filed Dec. 27, 1983, Ser. No. 565,421

Int. Cl.³ F26B *3/00*

U.S. Cl. 34—9 **9 Claims**



1. An economic and energy efficient process for the thermal dewatering of coal comprising:
preparing an aqueous slurry of the coal;
pressurizing and heating the slurry to a temperature range of about 150°–350° C. and a corresponding pressure sufficient to prevent vaporization of water in order to release the chemically attached water of the coal into the liquid phase;

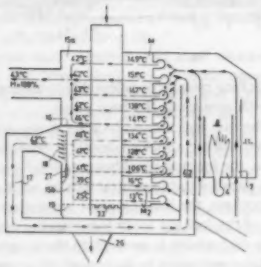
passing the slurry through a gas separation unit to separate the CO_2 and some water vapor therefrom;
cooling the heated slurry by transfering heat to a cooled heat transfer fluid in a suitable heat exchange unit;
pressure filtering the pressurized coal slurry to form a dry coal filter cake having a minimal water content;
contacting the filter cake with a hot gas stream to further dry the coal particles;
collecting the dewatered dried particles in an effective separation unit.

4,486,960

MODULAR DRIER FOR DRYING GRAINS

Jean Maurice, Saint Germain de la Grange, and Bernard Vauthier, Paris, both of France, assignors to Renault Techniques Nouvelles Appliquees, Boulogne-Billancourt, France

Filed Oct. 14, 1982, Ser. No. 434,323
Claims priority, application France, Oct. 20, 1981, 81 19658
Int. Cl.³ F26B *17/12*
U.S. Cl. 34—64 **6 Claims**



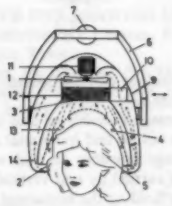
1. A modular grain drier in which gravity draws the grain being dried down in parallel sheets crossed horizontally by drying air, said modular grain drier comprising:
(a) a plurality of superimposed modules which in combination form two groups of grain columns, each group of grain columns comprising two yoked grain columns, the two columns in each group of grain columns being separated by a diffusing chamber through which drying air is blown horizontally and parallel to the adjacent parallel sheets of downwardly descending grain, each of the two groups of grain columns being surrounded by a common used air exhaust chamber which also extends between the two groups of grain columns, the width of the grain columns being greater in the modules at the bottom of the drier than in the modules at the top of the drier, each portion of the grain columns in each module being separated from the associated diffusion chamber and from the common used air exhaust chamber by a perforated partition which allows air to pass through said which comprises a plurality of horizontal sections in the form of downwardly inclined venetian blinds, a vertical air deflector being disposed on the edge of each of said downwardly inclined venetian blinds extending into the associated diffusion chamber to regularize the intake of air, avoid eddies, and reduce the speed component of the drying air in the horizontal direction;
(b) a plurality of ventilation fans, one of said ventilation fans being arranged to pass drying air horizontally through the diffusion chambers in each of said modules;
(c) an air heater which heats the drying air passed through the upper ones of said modules;
(d) a hoppr disposed beneath said modules in position to receive the grain as it issues from the grain columns, said hopper being in fluid communication with the common used air exhaust chamber through openings leading to the common used air exhaust chamber between the two groups of grain columns and outside each group of grain columns;
(e) a horizontal partition which divides the common used air exhaust chamber into an upper part and a lower part, the upper part of the common used air exhaust chamber being in fluid communication with the atmosphere and with a first group of modules which are supplied with drying air heated by said air heater and the lower part of the common used air exhaust chamber being in fluid communication with a second group of modules which are supplied with drying air heated by said air heater and a third group of modules which are supplied solely with unheated air for cooling the grain being dried;
(f) a first air recycling duct which connects the lower part of the common used air exhaust chamber to the supply of drying air heated by said air heater before the heated drying air enters the second group of modules;
(g) means for controlling the proportion of heated drying air and recycled air from said first air recycling duct which enters the second group of modules; and
(h) a heat exchanger located in an inlet duct which brings unheated air to said air heater, said heat exchanger bringing unheated air being fed to said air heater into thermal exchange relationship with used air from the upper part of the common used air exhaust chamber.

4,486,961

HAIR DRYER

Marinus Giesselbach, and Wendela Giesselbach, both of Castricum, Netherlands, assignors to GAP Gesellschaft fiir Auswertungen und Patente AG, Glarus, Switzerland

Filed Mar. 18, 1983, Ser. No. 476,669
Claims priority, application Fed. Rep. of Germany, Apr. 10, 1982, 3213555
Int. Cl.³ A45D *20/28*
U.S. Cl. 34—80 **6 Claims**



1. A bonnet-shaped portable hair dryer adapted for first preheating and then drying of circulating warm air using a regeneratable drying filter unit heated by the blower motor said regeneratable drying unit adapted to be regenerated and reused consisting essentially of:
a double walled hood having an inner hood and an outer hood;
said inner hood being formed with an inwardly projecting inner wall flange to adapt a close fitting of the inner wall of said double walled hood close to and surrounding the hair of the person;
the lower edge of said outer hood being also disposed inwardly but at a distance to form a continuous edge slit with less than the inner wall flange of said inner walled hood thereby providing a continuous air inlet slit assuring the passage of all incoming air exclusively through the outer wall and also permitting the recirculation of air after it leaves the hair for passage back to the slit, upwardly through the outer walled hood and to the motor and fan for reheating and recirculation through the unitary filter insert;
said inner hood of said double-walled hood comprising an inner perforated wall which lies closest to the head of the

person with the hood in place and said outer hood communicating with said inner hood so that all of the room temperature air enters the outer wall through the continuous edge slit at the lower edge and exits through the perforations of the inner perforated wall against the hair after being heated by the motor at the top of the hood;

a holder for mounting said double walled hood;

an electric motor mounted in said outer hood at the top of said double walled hood;

a fan mounted immediately below said motor;

a replaceable dehumidification unitary filter insert which is mounted immediately below said fan whereby all of the air which enters at room temperature into the double-walled hood at the lower edge passes upwardly from the outer wall of the double-walled hood to the motor for heating and then to the inner wall of the double-walled hood by means of such fan so as to pass through said filter insert unit and thereafter through the inner wall of said hood to directly impinge against the hair being dried;

said motor constituting the sole heating means placed at the top and over the filter unit and fan within the outer wall of the double-walled hood whereby all of the room temperature air passes along the entire height of the inside outer wall of the double-walled hood prior to being heated by said motor and prior to impinging on the hair; and

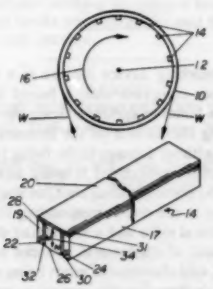
said inner perforated wall of said double walled hood being perforated at the surface closest to the hair of the person whereby the air circulating upwardly through the outer wall of the double-walled hood is heated to a temperature of about 37° C. and brought through the unitary filter insert to dry it.

4,486,962

MAGNETIC SPOILER BAR APPARATUS

Gregory L. Wedel, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Filed Jul. 29, 1982, Ser. No. 403,230
Int. Cl.³ F26B *13/08*
U.S. Cl. 34—110 **18 Claims**



1. A spoiler bar assembly for mounting on the inner peripheral wall surface of a rotary, condensable fluid heated web drying drum, such as a steam heated dryer roll for drying a moist paper web on a papermaking machine, to interrupt the condensate on the inner wall surface to thereby improve the heat transfer through the drum, comprising:

at least a pair of rail members, which are not themselves magnets capable of conducting magnetic flux, and having edge surfaces for mounting against the inner peripheral surface of the dryer drum;

backing plate means attached to the rail members to form an enclosing structure therewith;

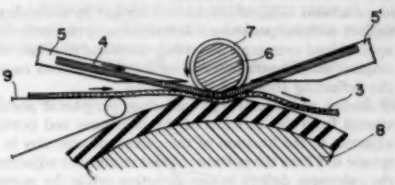
magnet means, having magnetic pole faces, disposed within the structure to form therewith a spoiler bar assembly, with at least one of its magnetic poles positioned to transmit magnetic flux through the rail members for securing the spoiler bar assembly to the dryer drum.

4,486,963

METHOD AND APPARATUS FOR DRYING VENEER SHEET

Masaru Koike; Yasumasa Hasegawa; Satoru Shimosaka; Nagara Aoyama, and Toshihiko Yoshizumi, all of Ohbu, Japan, assignors to Meinan Machinery Works, Inc., Ohbu, Japan

Division of Ser. No. 176,995, Aug. 11, 1980,. This application Sep. 28, 1982, Ser. No. 425,926
Claims priority, application Japan, Aug. 20, 1979, 54-106408; Dec. 8, 1979, 54-159423
Int. Cl.³ F26B *11/02*
U.S. Cl. 34—116 **4 Claims**



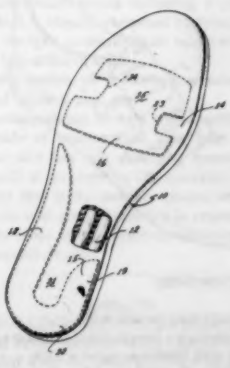
1. An apparatus for drying a veneer sheet comprising a plurality of juxtaposed rotary heaters adapted to feed a veneer sheet in a predetermined direction; two sets of elongated resilient members passed over said rollers to hold the veneer sheet between said two sets, each elongated resilient member including a coil spring, each rotary heater having recesses thereabout to receive the elongated resilient members to bring the veneer sheet held between said sets into a contact engagement with the rotary heater; and speed-reducing means for decelerating the rotary heaters to a progressively larger extent toward a down stream side with respect to the veneer movement.

4,486,964

SPRING MODERATOR FOR ARTICLES OF FOOTWEAR

Marion F. Rudy, 19001 Vintage St., Northridge, Calif. 91324

Filed Jun. 18, 1982, Ser. No. 389,866
Int. Cl.³ A43B *13/48*
U.S. Cl. 36—28 **19 Claims**



1. An article of footwear of the type described, comprising:

an upper and at least a sole secured to said upper such that the wearer's foot is positioned within said upper and above said sole,

cushioning material located between said sole and the wearer's foot,

a high modulus moderator located between the wearer's foot and above said cushioning material,

said moderator being a relatively thin, lightweight member of a material having a modulus of elasticity of at least about 250,000 psi,

said moderator including a medial leg and a lateral leg and a heel portion interconnecting said two legs,

said legs and heel portion being relatively flat,

said moderator being positioned within said midsole and above said cushioning material such that when the wearer's foot is inserted into the footwear the medial and lateral legs overlie the cushioning material and are located on each side of the calcaneus while the rear portion of the moderator overlies the cushioning material and is located behind the calcaneus whereby a cushioning medium is provided below the calcaneus,

said moderator being characterized further by the ability to deflect without permanent deformation in response to an applied load creating a deflecting stress and to return to its original shape upon removal of the applied load causing the deflecting stress,

said medial and lateral legs including peripheral portions spaced from the location of the calcaneus and portions adjacent to the location of the calcaneus whereby in response to a load the portions of said moderator adjacent to the calcaneus deflect in one direction while the portions thereof spaced from the calcaneus deflect in another direction, and

said moderator being operative to absorb, redistribute and store the energy of localized loads applied thereto through deflection and to return energy to the wearer at a rate equal to or greater than the rate at which the applied load is removed.

4,486,965

FOOTWEAR WITH OVERLAPPING CLOSURE STRAP MEANS

Michael R. Friton, Eugene, Oreg., assignor to Nike, Inc., Beaverton, Oreg.

Continuation-in-part of Ser. No. 378,381, May 14, 1982, abandoned. This application Dec. 23, 1983, Ser. No. 564,689

Int. Cl.³ A43B *11/00*

U.S. Cl. 36—50 **18 Claims**

1. Footwear comprising:

a sole;

and an upper attached to said sole;

said upper containing a longitudinal slot and securing means for securing said footwear upon a foot;

said slot having a first edge and a second edge opposite thereto;

said securing means comprising a plurality of closure strap pairs, each strap of said strap pairs comprising two spaced legs joined together at one end and an attaching tab extending from said joined edge, and hook and pile fastening materials having a hook fastening component and a pile fastening component;

a first strap of said strap pairs being fixedly attached at the end opposite the attaching tab to said first edge, and a second strap of said strap pairs being fixedly attached at the end opposite the attaching tab to said opposite second edge, said first and second straps extending in opposite directions across said slot and overlapping each other longitudinally of said slot, each of said straps having one of said fastening components attached to the attaching tab thereof on a side thereof facing said upper, with the other of said fastening components attached adjacent to the longitudinal slot edge opposite to the edge to which the strap is attached, whereby said first and second straps can be pulled taut in opposite directions in mutually overlapping relationships and releasably fastened to said upper by said hook and pile fastening material, with at least a portion of one of said straps extending through the opening between the spaced legs of said other strap when said straps are releasably fastened to said upper.

4,486,966

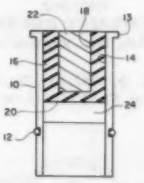
SAFETY DEVICE FOR FIREARMS

Jack C. Seehase, 1200 Osceola Ave., Winter Park, Fla. 32789

Filed Dec. 8, 1983, Ser. No. 559,309

Int. Cl.³ F41C *27/00*

U.S. Cl. 42—1 N **6 Claims**



1. An energy-absorbing device for use in a shotgun, rifle, pistol, or other gun equipped with a barrel having a bore therein, a breech, a hammer spring, a firing pin and a trigger, said device enabling the tension on the hammer spring of the gun to be relieved without damage to the firing pin, said device comprising a generally cylindrical housing member approximately the size of the corresponding shotgun shell or cartridge, said housing having at the end corresponding to the primer, a hole having cylindrical sides and a substantial depth, a generally cylindrical insert of elastomeric material arranged to fit tightly in said hole, said elastomeric insert being equipped with a central aperture, a non-metallic central member of a size closely approximating the length and diameter of said central aperture, being disposed in said central aperture, with one end being approximately flush with said end of said housing member, thus to place said one end of said central member approximately in the position of the primer of a shell or cartridge, whereby upon said device being placed in the breech of the gun and the trigger pulled, the firing pin impacts said one end of said central member, causing the latter member to move longitudinally, with said elastomeric insert acting as a non-metallic type of spring member, such that the interaction of said central member and elastomeric insert serves to safely dissipate the energy of the firing pin of the gun during the dry firing thereof, the central aperture of said elastomeric insert being of a depth less than the length of said elastomeric insert, thus to create a bottom portion that is contacted by the other end of said central member.

4,486,967

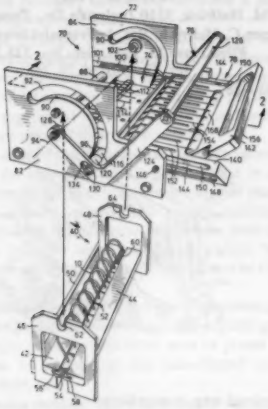
LONGLINE BAITING

Everett G. Fancey; John V. Peters, and Russell E. Tucker, all of St. John's, Canada, assignors to Nordco Limited, St. John's, Canada

Division of Ser. No. 277,912, Jun. 26, 1981, Pat. No. 4,437,254. This application Dec. 16, 1983, Ser. No. 562,075

Int. Cl.³ A01K *79/00, 91/00*

U.S. Cl. 43—4.5 **5 Claims**



1. A longline baiting method for baiting hooks which are each connected by a snood line to spaced points along a longline comprising the steps of,

(a) locating a gang of adjacent hooks of a longline in a side-by-side laterally spaced relationship in a row with their crook-shaped head portions aligned and their pointed ends exposed for baiting,

(b) retaining said gang of hooks in a fixed position with respect to one another; and

(c) simultaneously hooking the gang of hooks into bait while the gang of hooks are retained in said fixed position with respect to one another.

4,486,968

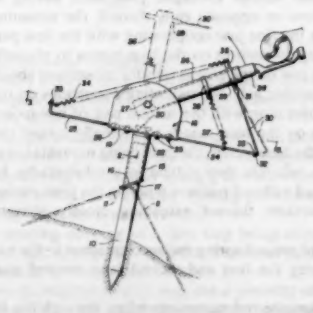
FISHING ROD SUPPORT AND TRIGGER

Kermit T. Gould, 3228-A Wade Hampton Blvd., Taylors, S.C. 29687

Filed Dec. 15, 1982, Ser. No. 450,069

Int. Cl.³ A01K *97/10*

U.S. Cl. 43—15 **3 Claims**



3. A fishing device comprising an anchor stake adapted to be inserted in the soil in a generally upright position, a support arm structure fixed to the stake ner its top substantially perpendicular thereto and projecting on opposite sides of the stake, a support and pivot means fixed to the stake and having a pivot axis above said support arm structure substantially at right angles thereto, a fishing rod handle support sleeve pivotally attached to the support and pivot means for rotation around said pivot axis of the means, a tension spring connected between one end of the arm structure and said sleeve and biasing the sleeve to a fish-catching position, a latch arm attached to said sleeve near the forward end of the sleeve and having releasable locking engagement with the other end of the arm structure, said support arm structure comprising a U-cradle at the top of said stake, and a sleeve fixed dependingly to the bottom wall of the U-cradle and engaging telescopically and removably over the top of the stake.

4,486,969

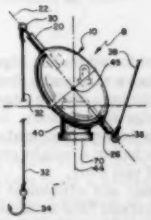
BOBBER WITH ILLUMINATED SIGNAL

Paula S. Swenson, Westminster, Colo., assignor to Neptune Products Inc., Denver, Colo.

Filed Mar. 28, 1983, Ser. No. 479,883

Int. Cl.³ A01K *93/00*

U.S. Cl. 43—17 **19 Claims**



1. A bobber for a fishing line which provides a signal to the fisherman when a fish strikes, said bobber comprising:

a hollow, sealed, floatable body member having a normally vertical axis;

ballast means within said body member longitudinally aligned with said vertical axis to maintain said body member in a normal upright position in the water while waiting for a fish to strike;

a signal device within said body member;

electrical circuit means within said body connected to said signal device to provide electrical power to said signal device, said circuit means including a position-sensitive switch which is closed when said body member is moved from said upright position about said vertical axis in response to the strike of a fish;

hook attaching means on said body member offset to one side of said vertical axis; and

fish line attaching means on said body member offset to the opposite side of said vertical axis, said hook attaching means and said fish line attaching means lying along a common axis at an angle to and intersecting said vertical axis so that said body member pivots about a center of gravity from said upright position in response to the strike of a fish to close said position-sensitive switch and energize said signal device.

4,486,970

TROLLING DEPTH CONTROLLER

Wilfred Larson, 41244 Medway Ave., Quartz Hill, Calif. 93534

Filed Aug. 31, 1976, Ser. No. 719,287

Int. Cl.³ A01K *95/00*

U.S. Cl. 43—43.13 **4 Claims**

1. A trolling depth controller which comprises:

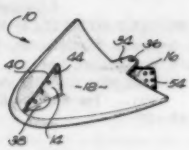
a body having generally the shape of a delta wing, said body

having upper and lower sides, a nose portion, leading edges extending away from said nose portion and connecting said upper and lower sides and a trailing edge extending between said leading edges and connecting said upper and lower sides,

said lower side having a lower convex surface extending generally between said nose portion, said leading edges and said trailing edge,

said troller having an upper vane extending upwardly from said upper surface, said upper vane being located adjacent to and extending rearwardly from said nose portion and being spaced equally from said leading edges of said body and said upper vane having a rearwardly sloped leading edge and a trailing edge,

said body also including a lower vane extending downwardly from said lower surface, said lower vane being



located adjacent to said trailing edge and having a leading edge which slopes rearwardly from said lower convex surface and including a trailing edge located to the rear of said trailing edge of said body, said lower vane being located midway between said leading edges of said body,

said body also including a weight centrally located in said nose portion of said body,

first line attachment and adjustment means for attaching a towing line to various fixed locations along a front portion of said upper vane located on said upper vane,

other line attachment and adjustment means for attaching a towed line to various locations along a rear portion of said lower vane located on said lower vane,

wherein a drag on said towed line will cause said depth controller to flip to a vertically reversed position,

said body and said vanes comprising a one piece structure.

4,486,971

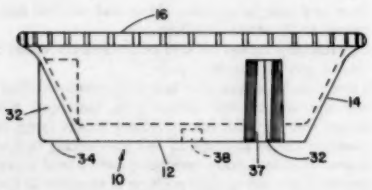
TROT LINE DISPENSER

Lynn D. Miller, 8992 Hanover Hill Rd., Hanover, Ill. 61041

Filed Sep. 16, 1983, Ser. No. 532,875

Int. Cl.³ A01K *97/00*

U.S. Cl. 43—57.3 **7 Claims**



1. A trot line dispenser, comprising a bowl-like receptacle having a circular bottom and an annular wall joined to and sloping upwardly and outwardly from the bottom and terminating in an upper circular rim integral with the wall, said rim joining the interior surface of the annular wall at a smooth annular junction and having an upper surface extending radially outwardly from said junction and bordered by an outer, circular marginal edge, said rim further having uniformly angularly spaced thereabout a plurality of radial slots opening at said rim surface and at said outer marginal edge, each slot being of maximum depth at said outer marginal edge and diminishing in depth to substantially zero substantially at the annular junction of the rim with the inner surface of the annular wall, the surface portions among the slots being smooth to enable free passage of lines from the interior of the receptacle outwardly over the rim without snagging.

4,486,972

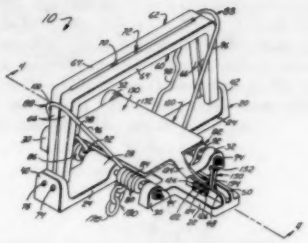
ANIMAL TRAP

Clarence M. Helfrich, 3310 Ingleside Dr., Parma, Ohio 44134, and James C. Helfrich, Rte. 1, Fredericktown, Ohio 43019

Filed Nov. 23, 1981, Ser. No. 323,233

Int. Cl.³ A01M *23/26*

U.S. Cl. 43—88 **5 Claims**



5. An animal trap, comprising:

(a) base means for:

(i) defining first and second pairs of jaw-mounting formations, the formations of the first pair being located near opposite sides of the base means and extending along a first jaw-mounting axis, the formations of the second pair being located near the same opposite sides of the base means and extending along a second jaw-mounting axis, the first and second jaw-mounting axes extending substantially parallel to each other;

(ii) defining first and second sets of spring-mounting formations, with the formations of each set including a central formation and a pair of end formations located on opposite sides of the central formation and spaced therefrom, the formations of the first set having a first set of aligned holes formed therethrough and extending along a first spring-mounting axis, the formations of the second set having a second set of aligned holes formed therethrough and extending along a second spring-mounting axis, the first and second spring-mounting axes extending substantially parallel to each other and extending transverse to the first and second jaw-mounting axes;

(b) first and second U-shaped jaws each having mounting formations on opposite ends thereof, the mounting formations on the first jaw cooperating with the first pair of jaw-mounting formations on the base means to pivotally mount the first jaw on the base means for movement about the first jaw-mounting axis, the mounting formations on the second jaw cooperating with the second pair of jaw-mounting formations on the base means to pivotally mount the second jaw on the base means, the jaws being movable between a set position wherein they extend in a substantially horizontal plane, and a closed position wherein the jaws are upstanding with portions thereof extending closely alongside each other;

(c) first and second spring means connected to the base means for biasing the first and second jaws toward their closed position;

(d) first elongate rod means extending through the first set of aligned holes and connected to the first spring means for mounting the first spring means on the base means, and second elongate rod means extending through the second set

of aligned holes and connected to the second spring means for mounting the second spring means on the base means;

(e) trigger means carried on the base means for selectively retaining the jaws in their set position, and for selectively releasing the jaws to permit the first and second spring means to bias the jaws toward their closed position;

(i) the said trigger means includes a pan-shaped member having an elongate lever arm and a keeper member, both of which are pivotally connected between a pair of upstanding flanges on the base means;

(ii) the keeper member carries a hook-shaped means for engaging and releasably retaining at least a selected one of the jaws over the outside jaw edge in its set position;

(iii) the pan-shaped member has an actuating portion configured to be positioned between the first and second jaws when the jaws are in their set position;

(iv) the lever arm of the pan-shaped member carries formation means for engaging the keeper member on a lug at a position beneath the jaws to pivot the keeper member and spring the trap by moving the keeper member out of engagement with the selected one of the jaws when the pan-shaped member is depressed at a time when the keeper member is retaining the selected one of the jaws in its set position; and,

(v) adjustment means is provided for compressing the upstanding flanges on the base means and adjustingly clamping the keeper member and lever arm to preset the force which must be applied to the pan-shaped member to spring the trap; and,

(f) connector means coupled to the base means for securing the trap to a stationary object.

4,486,973

SHELLFISH TRAPS

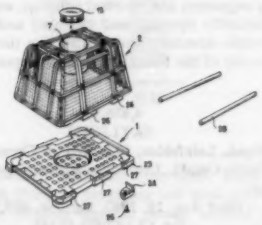
Michel Faucillon, Baillet En France, France, assignor to Allibert S.A., Grenoble, France

Filed Jul. 2, 1982, Ser. No. 394,589

Claims priority, application France, Jul. 3, 1981, 81 13142

Int. Cl.³ A01K *69/08*

U.S. Cl. 43—100 **6 Claims**



1. A shellfish trap comprising:

a weighted bottom section having a recess formed therethrough which protrudes outwardly from the plane of the bottom section; and

a cage section connected to the bottom section and separable therefrom for permitting the trap to be opened, the cage section having a truncated opening therein through which shellfish enter, the truncated opening positioned in space registry with the bottom recess;

the protruding opening of a first trap being dimensionally similar and engageable with the truncated opening of an adjacently nesting stacked trap;

wherein the bottom section includes a plurality of openings formed along the edge thereof for receiving concrete blocks therein, the blocks extending outwardly to form wear resistant members, the openings separated by bridge portions having passages formed therein which retain the concrete blocks in place.

4,486,974

INSECT ELECTROCUTION DEVICE

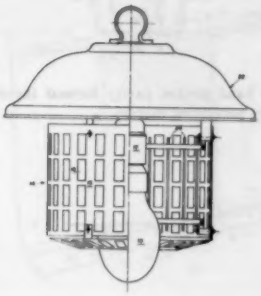
Mordechai Yavnieli, Ramat Hasharon, Israel, assignor to Amcor Ltd., Tel Aviv, Israel

Filed Sep. 27, 1982, Ser. No. 424,304

Claims priority, application Israel, Dec. 7, 1981, 64464; May 19, 1982, 65825

Int. Cl.³ A01M *1/22*

U.S. Cl. 43—112 **15 Claims**



1. Insect electrocution apparatus comprising:

means for producing radiant energy for attracting insects; and

an insect electrocution assembly disposed about said radiant energy producing means and including:

an outer electrode comprising a generally cylindrical grid having defined thereon a plurality of apertures separated by axially disposed continuous solid strips for permitting said radiant energy to pass outwardly therethrough and to permit insects to pass inwardly therethrough;

an array of elongate, axially disposed inner electrodes disposed radially inward of said solid strips and arranged to lie other than radially inward of said apertures,

the arrangment of said inner electrodes and said solid strips defining an insect electrocution region at the radially extending gap between said inner electrodes and said solid strips which is hidden from outside view by said solid strips, and such that dead insects falling from said electrocution region remain inside said outer electrode,

the total area of the apertures in the outer electrode being relatively small as compared with the non-apertured area thereof, thereby to define an insect trap; and

means for applying a voltage separation across said outer electrode and said array of inner electrodes sufficient to permit electrocution of insects located therebetween.

4,486,975

INFLATABLE NOVELTY DEVICE

Donald R. Harreld, Antioch, Ill., and Martin G. Wiessner, Oregon, Wis., assignors to Vonco Products, Inc., Lake Villa, Ill.

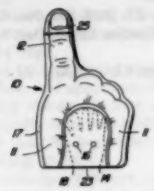
Filed Sep. 12, 1983, Ser. No. 531,056

Int. Cl.³ A63H *3/06*

U.S. Cl. 446—220 **14 Claims**

1. An inflatable novelty device comprising; an inflatable body of generally inverted U shape having two legs joined by a joining member and defined by a front flexible sheet, a rear flexible sheet, a peripheral edge seal near the outer edge and an inner edge seal near the inner edge forming a single inflatable cavity; a single valve means in said inflatable body capable of communication between said single inflatable cavity and the exterior in an inflation mode; and said front and rear flexible sheets between said legs of said inverted U shape inflatable

body forming a central non-inflatable body forming a central non-inflatable hand pocket having an open end for hand inser-



tion into the hand pocket cavity formed thereby and said inflatable body peripheral thereto.

4,486,976

WEED-KILLING ASSEMBLY

Bengt A. Samuelsson, Torpa, 590 30 Borensberg, Sweden

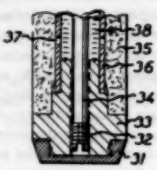
PCT No. PCT/SE81/00339, § 371 Date Aug. 4, 1982, § 102(e) Date Aug. 4, 1982, PCT Pub. No. WO82/01978, PCT Pub. Date Jun. 24, 1982

PCT Filed Nov. 20, 1981, Ser. No. 406,221

Claims priority, application Sweden, Dec. 8, 1980, 8008602; Oct. 13, 1981, 8106065

Int. Cl.³ A01M *21/00*

U.S. Cl. 47—1.5 **8 Claims**



1. Assembly for killing of weeds by applying liquid weed killer to the weeds, said assembly comprising:

a supporting means,

a source means for weed killer comprised within said supporting means,

a resilient elongated self-supporting structure for yieldingly engaging an obstruction, said self-supporting structure fastened at least at one end to the supporting means,

a capillary carrier for a weed killer, said capillary carrier positioned parallel to and around said self-supporting structure, said self-supporting structure being at least the same length as said capillary carrier, and

supply means communicating said source means of weed killer internally to the capillary carrier at said one end thereof, wherein the self-supporting structure has the form of an elongated resilient body and the capillary carrier has the form of a porous wick, and said other end of said resilient elongated self-supporting structure including a wear protection ballast means for maintaining the position of said other end in a desired treatment location.

4,486,977

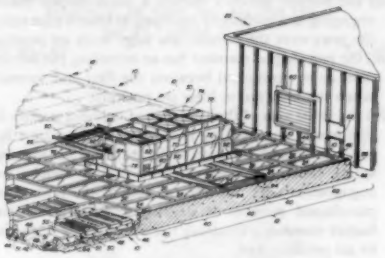
METHOD AND APPARATUS FOR GROWING AND HARVESTING LIVING ORGANISMS

Dale W. Edgecombe, and William L. Webster, both of Decatur, Ill., assignors to Edgecombe Enterprises International, Inc., Decatur, Ill.

Filed Aug. 12, 1982, Ser. No. 407,331

Int. Cl.³ A016 *31/00*

U.S. Cl. 47—59 **43 Claims**



1. The method of growing living organisms comprising the steps of:

(a) providing an enclosed, top-openable chamber having limited free space and receiving a removable structure supporting a multiplicity of the living organisms;

(b) exposing the living organisms in said chamber to a growth-inducing nutrient solution for a period sufficient to induce substantial growth in said living organisms under the conditions maintained in said chamber;

(c) substantially continuously removing a portion of said nutrient solution from said chamber, restoring the nutrient quality thereof and recycling the restored nutrient solution to said chamber;

(d) controlling the temperature within said chamber by substantially continuously flowing a temperature-controlled liquid through said chamber in exposed passages in heat exchange relationship with, but isolated from, said living organisms and nutrient solution; and

(e) periodically opening said chamber and removing said removable structure through the top thereof for further processing of the living organisms supported thereby.

4,486,978

SKYLIGHT

Wilhelm Frank, Leinfelden, Fed. Rep. of Germany, assignor to Wilh. Frank GmbH, Leinfelden-Echterdingen, Fed. Rep. of Germany

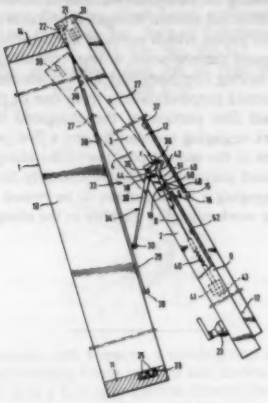
Filed Aug. 11, 1982, Ser. No. 407,256

Int. Cl.³ E05D *15/48*

U.S. Cl. 49—153 **5 Claims**

1. A skylight comprising a case, a wing mounted thereon for pivoting about a horizontal axis and swinging about a further horizontal axis, the wing including a frame with two longitudinal struts having respective outsides, pins projecting from the outsides of the wing and displaceable while supported on the case, the pins being arranged between the horizontal axes, a cover partially overlapping the wing and the case, the cover being linked at one end to the case and at an opposite end thereof to the wing, a guard on the wing for covering the case in the range not overlapped by the cover, a weight balancing device affixed below the guard and the cover on a respective outside of one of the longitudunal struts, a two-armed support lever pivotal about a bearing pin arranged between the horizontal axes and comprising a support arm carrying a roller, a tension arm extending in the direction of the cover, a tension spring linked to the tension arm and adjustable by a tensioning device affixed to the wing, the distance between the bearing pin and the longitudinal median plane of the tension spring

being smaller than the pivoting radius of the tension arm, and a guide arm pivotally arranged between the tension spring and



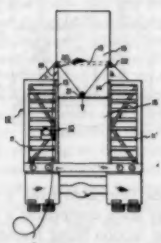
the tension arm to cooperate with a bolt fixedly arranged on the wing frame.

4,486,979

RELEASABLE GRIP-LOCK DEVICE FOR FLEXIBLE ELONGATE CONNECTORS AND STRUCTURES ACCOMMODATING LIVESTOCK

Frank J. Reitemeyer, Rowland Rte., Bruneau, Id. 93604

Filed May 24, 1983, Ser. No. 497,502
Int. Cl.³ E05F *11/04*
U.S. Cl. 49—347 **9 Claims**



8. In combination: a guillotine-type door; fixed structure provided a frame slideably mounting said door and having at least one pulley; flexible elongate means secured over said pulley and cooperable with said door whereby to raise the same upon the pulling of said flexible elongate means; and a releasable gripping device secured to said fixed structure and receiving said flexible elongate means, said gripping device including: spring-biased jaw means for selectively gripping said flexible elongate means; means for selectively positively opening said jaw means in cocked position; and control means for uncocking said jaw means whereby to grip said flexible elongate means.

4,486,980

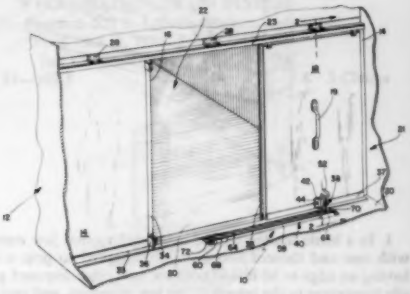
TRACK AND LATCH ASSEMBLY FOR SLIDABLE DOOR

Edward J. O'Bar, Harrisville, R.I., assignor to Jannel & Son Body Company, Woonsocket, R.I.

Filed Jan. 20, 1983, Ser. No. 572,762
Int. Cl.³ E05D *13/04*
U.S. Cl. 49—449 **9 Claims**

1. A track and latch assembly for a slidable door, wherein the door is slidably supported adjacent a wall so that it is movable between an open position, wherein an opening in the wall is substantially unobstructed by the door, and a closed position wherein the opening is substantially obstructed by the door, the door being at least slightly pivotable about an axis adjacent the upper end thereof for movement of the lower end of the door outwardly slightly with respect to the wall, said track and lock assembly comprising:

(a) latch means mounted on said door adjacent the lower end thereof; and



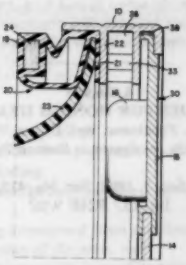
(b) track means mounted in a fixed position with respect to said wall adjacent the lower end of said door, said latch means being received in said track means and cooperating therewith to guide and position said door so that when it is in one of said open or closed positions thereof, it is in snug engagement with said wall adjacent the lower end of said door but so that during movement of said door between said open and closed positions thereof, the portion of said door adjacent the lower end thereof is spaced outwardly from said wall.

4,486,981

REFRIGERATOR DOOR

Kurt Billen, Körperich, Fed. Rep. of Germany, assignor to Electrolux S.a.r.l., Vianden, Luxembourg

PCT No. PCT/EP82/00128, § 371 Date Feb. 22, 1983, § 102(e) Date Feb. 22, 1983, PCT Pub. No. WO83/00212, PCT Pub. Date Jan. 20, 1983
PCT Filed Jun. 19, 1982, Ser. No. 486,950
Claims priority, application Sweden, Jun. 30, 1981, 8104080
Int. Cl.³ E06B *3/00*
U.S. Cl. 49—501 **7 Claims**



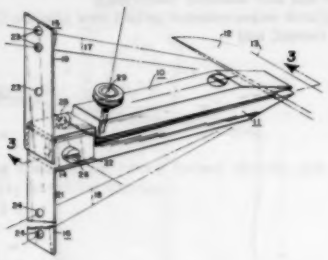
1. A refrigerator door having a frame of joined parts, an outer shell, an inner door lining and heat insulation, characterized in that a top frame part (**10**) and a bottom frame part (**11**) at their ends having a bushing (**26**) for a pivot pin of a hinge, the bushing (**26**) being insertible in a sleeve (**33**) on a side part (**12,13**) of the frame.

4,486,982

FOLDABLE HOLDING DEVICE

Howard R. Longbrake, 16740 Indian Hollow Rd., Grafton, Ohio 44044

Filed Feb. 15, 1983, Ser. No. 451,446
Int. Cl.³ B24B 3/54
U.S. Cl. 51—68 1 Claim



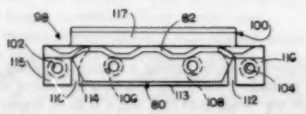
1. In a blade honing device having elongated jaw members with one end thereof cooperatively adapted to grip a blade having an edge to be honed with the said edge disposed generally transverse to the length of the jaw members, and two hone guide members mounted on one of the jaw members remote from said one end with a selected one of said members guiding a hone in a selected path generally lengthwise of the jaw members and in engagement with a transverse to the edge of a blade being honed, the improvement comprising said guide members being pivotally movable relative to said jaw members between an operative position and a folded position, each said guide member having a hone guide portion and a mounting wing portion extending at right angles to and from said hone guide portion and said guide members being at least similar to each other and the pivot axes being separated from each other a distance greater than one-half the thickness of the guide portion and where the pivot axis of at least one of said guide members being so displaced from said end of said jaw member that said one of said guide members abuts said end of said jaw member when said guide member is in said operative position, and fastening means pivotally fastening each said mounting wing portion to its respective of the opposite sides of said jaw member on respective separate pivot axes perpendicular to the length of said jaw members and remote from said one end thereof, when in said operative position the ends of the guide portions at the wing portions overlap each other at the end of the jaw member remote from the said one end and the hone guide portions extend outwardly from said jaw members in opposite directions therefrom so that the hone may be guided in said preselected path, when in said folded position the guide portion of each guide member lies contiguous to and lengthwise along at least one of said jaw members.

4,486,983

GUIDES FOR HONING HEADS

Robert M. Sunnen, Frontenac, and Duane W. Woltjen, Manchester, both of Mo., assignors to Sunnen Products Company, St. Louis, Mo.

Filed Sep. 7, 1982, Ser. No. 415,488
Int. Cl.³ B24B 9/02
U.S. Cl. 51—347 11 Claims



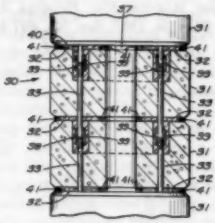
1. A guide assembly for a honing mandrel comprising an elongated member having opposite surfaces and spaced side edges, means including slot means formed in the elongated member weakening the elongated member to form the member into adjacent first and second elongated portions on opposite sides of the slot means which portions are capable of relative angular movement therebetween, at least two elongated parallel rack gears having corresponding ends connected at spaced locations to extend perpendicularly from one of the opposite surfaces of said first portion of the elongated member, an elongated work engaging member having a first portion positioned adjacent to the second position of the elongated member and a second portion extending outwardly from the first portion for engaging a work surface to be honed, and means connecting the work engaging member to the elongated member.

4,486,984

METHOD FOR CONSTRUCTION OF A PRECAST CHIMNEY

John J. Carty, 2 Model Ct., Rocky Point, N.Y. 11778

Filed Sep. 24, 1982, Ser. No. 423,163
Int. Cl.³ E04H 12/28
U.S. Cl. 52—125.5 11 Claims

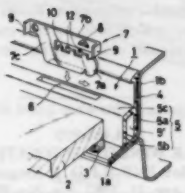


1. A chimney stack fabricated from a number of precast sections, said chimney stack comprising a plurality of precast sections, each precast section being formed so as to define a centrally positioned flue shaft passing entirely therethru, said precast sections having positioned therein structural support members that have been placed under pre-tension stress prior to placement within said precast sections, said structural support members having an upper portion and a lower portion, said upper portion of said structural support members being exposed within a recess cavity formed within the upper portion of said precast section, there being a defined distance between the top of said upper portion of said structural support member and the top surface of said precast section, the lower portion of said structural support members extending beyond the lower surface of said precast sections a distance equal to said defined distance existing between the top of said upper portion of said structural support member and the top surface of said precast section such that upon placing a first precast section upon a second precast section said lower portion of said structural support member of said first precast section axially aligns with and structurally abuts said upper portions of said structural support members of said second precast section upon which said first precast section is placed, means for sealing the spacing existing between the respective precast sections as they are placed one on top of the other.

4,486,985
MOLDING CLIP

Kazuhiro Kagitani; Seikichi Yoshitsugu, both of Sayama, and Akira Mizusawa, Fujisawa, all of Japan, assignors to Nissan Motor Co., Ltd. and Nifco Inc., both of Yokohama, Japan

Filed Jul. 8, 1981, Ser. No. 281,312
Claims priority, application Japan, Jul. 16, 1980, 55-99298[U]
Int. Cl.³ E06B 3/58
U.S. Cl. 52—127.7 8 Claims

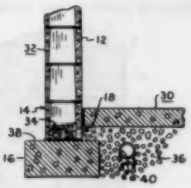


1. In combination with a spacer, a molding and a frame-like depression, said molding being resilient and having a retaining means integral with a first edge portion thereof for permitting said molding to be retained adjacent said spacer, said depression being formed in a body for securing a pane of glass to said body, said molding having a second edge portion resiliently engageable with said pane of glass, said depression including a first wall and a second wall integral with said first wall and substantially transverse thereto, said pane of glass being interposed intermediate said second edge portion of said molding and one of said first and second walls, said spacer being formed of a back member and an integral projecting front member forming a step, said step being transverse to said back member, the remainder of said front member being spaced from said back member thereby forming a void intermediate the lower front surface of said back member and said front member, the rear surface of said back member being secured to the other one of said first and second walls, said step including a plurality of longitudinally spaced, longitudinally elongated slits communicating with said void, an improved molding clip comprising: an insertion member inserted through one of said slits from above and positioned within said void; an operating member superpositioned above said step, said molding being positioned within said depression intermediate said operating member and said back member after said insertion member has been positioned in said void; there being an elongated slot open at one end thereof and disposed intermediate said insertion member and said operating member, said slot having a width sufficient for inserting said insertion member into said void; and, a connecting portion integral with said insertion member and said operating member and forming a closed end of said slot, said insertion member including transversely stabilizing means for transversely stabilizing said operating member relative to said step with said insertion member positioned in said void, said clip having been moved longitudinally relative to said slit, said operating member having an upper edge and including a projection integral with and disposed outwardly from the rear surface of said operating member and spaced downwardly from the top edge for engaging said molding and said retaining means of said molding, said projection including means for biasing said retaining means toward said slit and for biasing said molding toward said front surface of said back member thereby positioning said first end portion of said molding between said member and said back member, said pane of glass having been positioned upon said one of said first and second walls, said second edge portion of said molding resiliently engaging said pane of glass, said operating member having at least one operating part projecting sufficiently far from the front surface of said operating member and extending downwardly from the upper edge substantially transversely thereof so as to provide a means engageable by a tool for moving said clip longitudinally relative to said slit to permit subsequent removal of said insertion member from said void thereby permitting removal of said clip from said slit for effective removal of said molding, said transversely stabilizing means comprising: at least one lug integral with said insertion member and outwardly disposed relative to the rear surface of said insertion member, said lug being disposed away from the open end of said slot, said lug having an end portion biasedly engageable with said lower front surface of said back member, said insertion member being positioned in said void, for biasing the front surface of said insertion member toward said front member.

4,486,986
FOUNDATION DRAIN SYSTEM

Michael A. Cosenza, 325 S. LaSalle, Hobart, Ind. 46342

Filed Mar. 9, 1983, Ser. No. 473,694
Int. Cl.³ E02D 19/00; E04D 17/00
U.S. Cl. 52—169.5 3 Claims



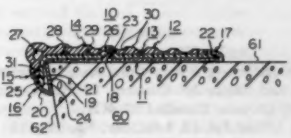
1. In a foundation structure of an enclosure including a footing and a masonery wall thereon wherein said masonery wall includes a hollow masonery course on said footing having holes formed through a side of said course communicating the hollow space of said course and the structure enclosure, the improvement comprising:

a plurality of stones in the hollow space of said course, said stones being at a level above said holes.

4,486,987
STAIR NOSING

Hiromitsu Naka, Yashio, Japan, assignor to Kabushiki Kaisha Naka Gijutsu Kenkyusho, Hokkaido, Japan

Filed Dec. 16, 1982, Ser. No. 450,548
Claims priority, application Japan, Dec. 18, 1981, 56-188074[U]
Int. Cl.³ E04F 11/16
U.S. Cl. 52—179 6 Claims



1. A stair nosing, comprising:

a flat metal frame for being secured to the tread of a stair, said frame including

a flat upper portion having a frame front edge and a frame rear edge,

a hook extending downward from said frame front edge for engaging the riser of the stair, and

an inturned bead integrally formed at said frame rear edge;

a non-skid sheet including

a rigid synthetic resin connecting plate for being secured to and over said frame, said plate having a sheet rear edge or insertion into said inturned bead, and a sheet front edge,

a flange extending downwardly from said sheet front edge and having a flange rib snappedly engagable into said hook, and

a non-skid tread having a tread front edge, formed of flexible synthetic resin, fixed on the upper surface of said connecting plate; and

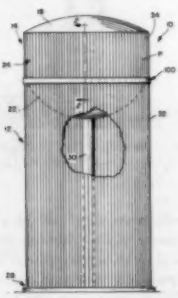
a tongue-shaped protector formed of flexible synthetic resin, integrally formed with said tread at said tread front edge so as to cover the engaging portions of said hook and said flange rib when said flange rib is snappedly engaged into said hook.

4,486,988

MULTI-PURPOSE ELEVATED WATER STORAGE FACILITY

Clarence H. Myers, Birmingham, Ala., assignor to Pittsburgh-Des Moines Corporation, Pittsburgh, Pa.

Filed Sep. 24, 1982, Ser. No. 423,253
Int. Cl.³ E04H 7/00
U.S. Cl. 52—192 **20 Claims**



1. An improvement in a multi-story elevated water storage facility comprising: an elevated water storage tank supported on a pillar and occupying substantially all of the top cross-sectional area of the pillar, means fluidly connected to the storage tank for distributing water from the tank to a user located outside the area immediately adjacent to the pillar, the facility having means associated with the pillar beneath the tank to define a building which is located in an elevated water storage tank structure so that a single structure serves as both an elevated water storage facility and a building, a multiplicity of flutes defined on the water storage tank to form a fluted portion of that tank, and connecting means connecting the fluted portion of the water tank to a bottom portion of the water tank.

4,486,989

ELEVATED STORAGE TANK

Donald J. DesRochers, 8 Riverside Crescent, Toronto, Ontario, Canada, and James M. Conners, 87 Holsworthy Crescent, Thornhill, Ontario, Canada L3T 4C5

Filed Jul. 12, 1982, Ser. No. 397,671
Int. Cl.³ E04H 7/02, 12/34
U.S. Cl. 52—194 **13 Claims**

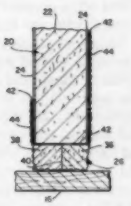
1. An elevated liquid storage tank comprising an upwardly extending tubular concrete shaft providing a horizontal upper surface, a generally tubular metal tank body supported on the shaft and having a unitary bottom wall comprising an endless horizontal plate bearing on said surface, means securing the plate to said surface, an inner conical wall portion having an outer margin integrally connected to the plate and inclining upwardly from the plate toward the center of the tank, and an outer conical wall having an inner margin integrally connected to the plate and inclining upwardly from the plate to an outer end, and a tank side wall extending upwardly from the outer end of the outer conical wall, the tank bottom wall being adapted to withstand compressive forces urging the outer margin of the inner conical wall portion and the inner margin of the outer conical wall portion in the direction toward one another.

4,486,990

REMOVABLE WINDOW INSULATION SYSTEM

Tamil D. Bauch, Box 394B R.F.D. 1, Kingston, N.Y. 12401

Filed Apr. 21, 1982, Ser. No. 370,525
Int. Cl.³ E06B 7/16; E04B 1/62
U.S. Cl. 52—202 **16 Claims**



8. A kit for assembly or do-it-yourself construction of window insulation systems from rigid insulation sheathing, the kit comprising a length of compressible strip material and adhesive, the strip material comprising a foam web and a vapor impermeable membrane, the membrane extending uninterruptedly along the length of the strip material and between the longitudinal edges thereof, the strip material being adapted for securement abutting the peripheral edges of a board formed from the insulation sheating and for being secured to the board by the adhesive, the strip material having an unstressed thickness suitable for an initial compression seal between a window frame and an insulation panel formed of the board and the strip material secured to the peripheral edges of the board, the strip material being further compressible from such initial compression sufficient to permit a user's fingers to enter between the window frame and the strip material for placement and removal of the panel whereby frequent insertion and removal from a window frame is facilitated.

4,486,991

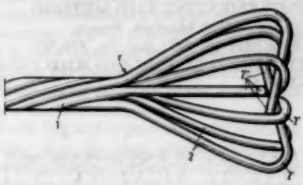
TIE-ANCHOR FOR REINFORCING CABLE

Kurt Rahlwes, Rossertstr. 8, D-6374 Steinbach; Wolfram Illgner, Kettelerstr. 29a, D-6360 Friedberg, and Dieter Reimann, Grosse Bockenheimer Str. 17, D-6000 Frankfurt/Main, all of Fed. Rep. of Germany

Continuation of Ser. No. 036,312, May 7, 1979, abandoned. This application Jan. 21, 1981, Ser. No. 226,578
Int. Cl.³ E04C 3/10
U.S. Cl. 52—223 L **6 Claims**

1. A tie-anchor for a reinforcing cable comprising, a plurality of steel wires, a first portion being entwined, a second portion being untwined with the wires being radially outwardly disposed, said second portion having a pear-shaped configuration for subsequently filling with concrete, a third portion wherein the wires are bent so as to be entwined sub-

stantially in a first plane, and wherein the free ends of the bent wires being substantially in a second plane adjacent the first



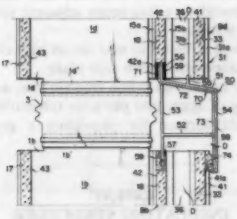
plane, said free ends being outwardly facingly disposed away from each other.

4,486,992

WATER-TIGHT APPARATUS FOR A CROSSED PORTION OF A UNIT TYPE CURTAIN WALL

Karl Gartner, Gundelfingen, Fed. Rep. of Germany, assignor to Yoshida Kogyo, K.K., Tokyo, Japan

Filed Aug. 1, 1983, Ser. No. 519,188
Claims priority, application Japan, Aug. 2, 1982, 57-116165
Int. Cl.³ E04H *1/00*
U.S. Cl. 52—235 **5 Claims**



1. A water-tight device in a crossed portion of a unit type curtain wall wherein vertical frame units composed of vertical frame members and battens therefor and horizontal frame units composed of horizontal frame members and battens therefor are rectangularly connected and are mounted at top and bottom and to left and right, said water-tight device comprises a pair of external packings for connecting between said vertical frame units adjacent to left and right of each other, a connecting member for connecting between said horizontal frame units adjacent to top and bottom of each other, and a connecting plate connected vertically between the top and bottom vertical frame units and horizontally between the left and right connecting members, and wherein spaces between said horizontal frame units adjacent to top and bottom of each other and between said pair of external packings are in communication with the exterior, while being maintained water-tight, so as to assume an atmospheric pressure equal to that of the exterior.

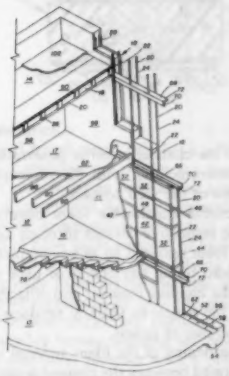
4,486,993

BUILDING STRUCTURE AND METHOD OF CONSTRUCTION

Douglas L. Graham, Auburn, and Mark L. Graham, Fort Wayne, both of Ind., assignors to Solarcrete Corporation, Cincinnati, Ohio

Continuation-in-part of Ser. No. 785,875, Apr. 8, 1977, Pat. No. 4,179,858. This application Oct. 12, 1978, Ser. No. 951,018
Int. Cl.³ E04B *1/00, 7/00*
U.S. Cl. 52—262 **6 Claims**

1. A building structure comprising a plurality of spaced-apart stud members, said stud members defining interstitial spaces therebetween each having a thickness generally equal to the width of said studs, said spaces each having a length generally equal to the length of said studs and a width generally equal to the spacing between said studs, said spaces each being filled with at least one generally rectangular block of self-supporting material thereby defining a column of said self-supporting material between each adjacent pair of said studs having a shape generally corresponding to said spaces, and elongated elements extending between said studs, said elements being connected to said studs, thereby forming a load bearing structure, a foundation, means for connecting said studs to said foundation, said studs and said columns upstanding from said foundation thereby forming a wall, said wall having a roof support connected thereto, a roof resting on said roof support and supported by said wall, said roof including a plurality of spaced-apart roof stud members, said roof stud members defining interstitial roofing spaces therebetween each having a thickness generally equal to the width of said roof studs, said roofing spaces each having a length generally equal to the length of said roof studs and a width generally equal to the



spacing between said roof studs, said roofing spaces each being filled with one or more of said generally rectangular blocks of self-supporting material thereby defining a roofing column of said self-supporting material between each adjacent pair of said roof studs having a shape generally corresponding to said roofing spaces, and elongated roof elements extending between said roof studs, said roof elements being connected to said roof studs, thereby forming a load bearing roof structure, said roof stud members comprise a pair of spaced-apart and generally parallel rods secured together at spaced-apart intervals by a plurality of spacers, said roof support comprises an angle member having two flanges disposed generally perpendicularly to each other, one of said flanges being supported by and resting on said spacers, the other of said flanges having spaced-apart apertures therein, the spacing of said apertures being generally the same as the spacing of said roof studs, one rod of each of said roof studs being positioned in each of said apertures.

4,486,994

PANEL WALL CONSTRUCTION HAVING AIRTIGHT JOINT AND METHOD OF FORMING SAME

Gary H. Fisher, and H. Patrick Padgett, both of Rockingham, N.C., assignors to Industrial Sheet Metal & Mechanical Corp., Rockingham, N.C.

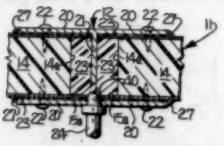
Filed Mar. 9, 1981, Ser. No. 241,725
Int. Cl.³ E04B *1/00*
U.S. Cl. 52—303 **17 Claims**

1. A method of forming a strong airtight joint between a pair of adjoining insulated panels having adjacent longitudinal edges positioned in and interconnected by an elongate channel member having respective pairs of opposing spaced apart legs for receiving the panels therebetween and having a web portion extending between and interconnecting the pairs of oppos-

ing legs, and the panels each having an insulated core and a pair of parallel skins on opposite sides of the core defining the exterior surfaces of the panel, and said method comprising

forming the panels with the insulated core thereof recessed inwardly from the pair of skins along at least one longitudinal edge of the panels,

positioning the pair of adjoining panels with the projecting longitudinal edge portions of the skins thereof extending into the channel member and positioned in opposing contacting relation with the adjacent legs of the channel member and with the recessed cores thereof forming respective longitudinally extending internal cavities within the channel member on opposite sides of the web portion,



forming a hole in the channel member penetrating the web portion and communicating with the respective cavities on opposite sides of the web portion,

injecting a hardenable expandable foam material simultaneously into the respective cavities through said hole and expanding the foam material so as to completely fill the cavities while also filling any cracks or gaps which may exist between the channel member and adjacent portions of the skins of the panels to thereby produce an airtight seal between the pair of panels,

whereeby upon hardening of the foam material in the cavities a bond is formed between the channel member and the adjacent portion of the skins to thereby provide enchanced structural strength in the joint.

4,486,995

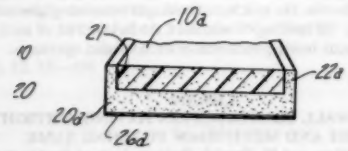
INSULATING PANEL

Robert L. Allen, 841 Panorama, Milford, Mich. 48042, and Peter H. Burgher, 3739 Cottontail La., Utica, Mich. 48087

Filed Apr. 5, 1982, Ser. No. 365,629

Int. Cl.³ E04C 1/00

U.S. Cl. 52—309.8 **6 Claims**



1. An insulating panel comprising:

a layer of plastic foam material;

a layer of cellulose and adhesive mixture wherein a first side of said cellulose and adhesive layer is formed with a dike or raised portion and wherein said plastic foam layer is bonded to said first side of said cellulose and adhesive layer within said raised portion;

a decorative layer; and

means for securing said decorative layer to a second side of said cellulose and adhesive layer.

4,486,996

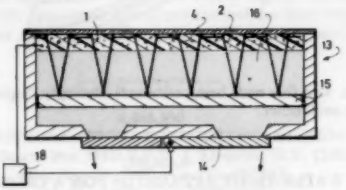
CONSTRUCTION-PANEL PREFABRICATION METHOD, PANELS THUS MADE AND EQUIPMENT FOR IMPLEMENTING SAID METHOD

Luis Alejos, Cadars, 82700 Montech, France

Filed May 19, 1982, Ser. No. 379,707

Int. Cl.³ B29D 27/04; E04C 1/00; B21D 7/024

U.S. Cl. 52—309.11 **19 Claims**



1. A pre-fabricated hollow panel, comprising:

(a) a three dimensional framework including a plurality of thrust bars arrayed in two generally parallel form planes with link bars connecting and fastened to said thrust bars;

(b) a molded insulating material plate surrounding said thrust bars of one of said form planes, said plate having a substantially uniform thickness less than said framework thickness for providing a free space adjacent said other one of said form planes;

(c) a form sheet adhered to said thrust bars of said one form plane in cooperation with said plate;

(d) said plate having an inside free surface; and,

(e) a plurality of aggregate particles substantially embedded in said free surface for providing a granular texture thereto.

4,486,997

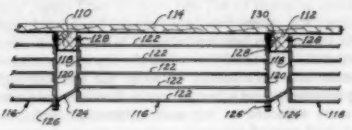
INSULATING STRUCTURE

Donald H. Roy, 544 Fern Park Dr., Glendora, Calif. 91740

Continuation of Ser. No. 264,227, May 18, 1981, abandoned, which is a continuation-in-part of Ser. No. 93,391, Nov. 13, 1979, abandoned. This application Oct. 28, 1983, Ser. No. 546,638

Int. Cl.³ E04B 1/74

U.S. Cl. 52—404 **8 Claims**



1. An insulating structure having a plurality of modules for installation adjacent an associated structural surface, and a plurality of associated parallel supporting members, each of said supporting members extending at right angles from said structural surface, each module extending from two adjacent supporting members, each module being disposed in side by side relation to at least one other module, each of said modules comprising:

first and second sidewalls in spaced substantially parallel relationship, each having inner and outer edges;

said first sidewall including a tab strip along its said inner edge foldable outwardly upon itself for connection of said inner edge of the first supporting structure adjacent the structural surface after the inner edge of said second sidewall has been connected adjacent the structural surface, said tab strip being formed from a portion of said first sidewall, and being defined by fold-enabling means, said first and second sidewalls being dimensioned and config-

ured to depend from respective facing surfaces of the first and second parallel supporting surfaces;

a plurality of reflective foil sheets connected to the first and second sidewalls, said foil sheets being oriented in mutually spaced substantially parallel relationship to extend (1) intermediate and (2) generally at right angles to said first and second sidewalls, the majority of said plurality of reflective foil sheets being disposed at a lower elevation than the lowest elevation of the first and second parallel supporting structures; and

one of said first and second sidewalls including a tensioning member along the outer edge thereof, each of said modules being attached by one of said tensioning members to at least one adjacent module at their respective outer side wall edges with their respective outer sidewalls in spaced relationship from said supporting structure and said supporting members to define an air space adjacent to the lowermost face of the supporting members.

4,486,998

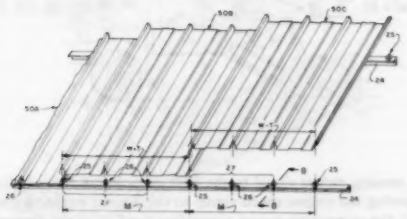
CONCEALED FASTENER ROOF OR WALL STRUCTURE AND METHOD OF ASSEMBLY

James G. Hague, Mars, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Filed May 7, 1982, Ser. No. 376,169

Int. Cl.³ E04D *1/34, 3/363*

U.S. Cl. 52—478 **6 Claims**



1. In a barrier structure having spaced-apart horizontally extending structural elements, plural panel members extending transversely of said structural elements and being erected in side-by-side relation, said panel members presenting alternating panel webs and downwardly opening longitudinal ribs including joint ribs comprising overlapped and interlocked complimentary partial ribs of adjacent panel members, each of said ribs including a crest, depending sidewalls, and spaced-apart inturned base portions connecting said rib sidewalls to adjacent ones of said panel webs, the improvement comprising:

each of said structural elements presenting sequentially arranged sets of uniformly spaced clips secured thereto, each of said sets including a fixed clip immovably secured to the structural element and plural movable clips, each capable of limited movement longitudinally of the structural element, the fixed clips of adjacent ones of said sets being spaced-apart at a distance corresponding to a selected modular width;

the fixed clips of said structural elements being aligned relative to each other transversely of said structural elements;

said clips being slidably connected to said ribs thereby to permit thermal movement of said panel members relative to said clips and transversely of said structural elements;

corresponding longitudinal ribs of said panel members being connected to the fixed clips of said sets whereby any of said panel members having a panel width different from said modular width undergo transverse expansion or contraction to conform the panel width to said modular width, and said movable clips undergo limited movement longitudinally of said structural elements into registry with the associated longitudinal ribs thereby to relieve stresses introduced into the panel by transverse expansion and contraction thereof.

4,486,999

CHECK RESISTING AND REINFORCING INSERT FOR WOOD POLE ENDS

Brian Bayne, S. 4333 Locust Rd., Spokane, Wash. 99206

Continuation of Ser. No. 466,565, Feb. 15, 1983,. This application Oct. 12, 1983, Ser. No. 541,063

Int. Cl.³ F16B *15/00*

U.S. Cl. 52—514 **1 Claim**

1. In combination,

an elongated round wood pole having flat end surfaces,

and a check resisting and reinforcing insert,

said insert comprising an open ended tubular body member having a continuous defining side wall formed in a star-shape with symmetrical projecting portions and constructed of rigid sheet material of high tensile strength,

said body member having a top driving edge and a bottom piercing edge to be driven endwise into the end of said wood pole longitudinally with the grain,

said symmetrical projecting portions of said star-shaped body member having defining side walls forming a contour of said body member with a plurality of adjoining wall portions with adjacent ones of said wall portions being disposed angularly relative to each other and all substantially continually intersecting the growth rings of the wood in a diagonal direction relative to the growth rings with the body member embedded endwise in said pole,

said wall portions of said side walls being joined by curved wall portions,

said symmetrical projecting portions of said body member symmetrically resisting radial checking from all sides around said round wood pole in which said body member is driven and also to reinforce said pole.

4,487,000

METAL REINFORCING STRIPS

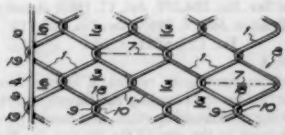
Anthony F. Ball, Huddersfield, England, assignor to Tinsley Wire (Sheffield) Limited, England

Filed Apr. 15, 1982, Ser. No. 368,669

Claims priority, application United Kingdom, Apr. 21, 1981, 8112252

Int. Cl.³ E04C *2/42*

U.S. Cl. 52—660 **15 Claims**



1. A reinforcing strip comprising wires welded together to form four-sided meshes having sides inclined to the longitudi-

nal direction of the strip, and a straight selvedge wire welded thereto to form along only one edge of the strip triangular meshes incapable of being elongated by tension in the longitudinal direction of the strip.

4,487,001

APPARATUS FOR FILLING CHARGERS WITH CIGARETTES OR THZ LIKE

Gerhard Tolasch, Wentorf; Bernhard Schubert, Neubörnsen, and Günter Menge, Hamburg, all of Fed. Rep. of Germany, assignors to Hauni-Werke Körber & Co. KG., Hamburg, Fed. Rep. of Germany

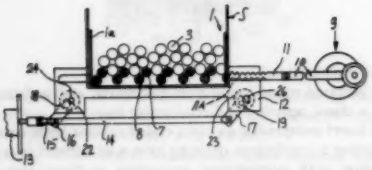
Continuation of Ser. No. 110,809, Jan. 10, 1980, abandoned, which is a division of Ser. No. 880,575, Feb. 23, 1978, Pat. No. 4,207,720. This application Oct. 19, 1981, Ser. No. 312,923

Claims priority, application Fed. Rep. of Germany, Mar. 5, 1977, 2709700

The portion of the term of this patent subsequent to Jun. 17, 1997, has been disclaimed.

Int. Cl.³ B65B *19/04*

U.S. Cl. 53—151 **9 Claims**



1. Apparatus for introducing plural layers of cigarettes or analogous rod-shaped articles into containers of the type having a bottom wall and a plurality of side walls, comprising a magazine arranged to store a supply of parallel articles and having a lower end portion provided with a plurality of article-discharging passages, a plurality of means for closing and exposing said passages to respectively prevent and permit the evacuation of articles from said magazine, said closing and exposing means being disposed in the interior of said magazine and being operative to allow for continuous evacuation of articles from said magazine via said passages as long as said closing and exposing means expose said passages; and conveyor means for maintaining the bottom wall of a container below said passage and for moving such container downwardly while said closing and exposing means permit the evacuation of articles via said passages, said lower end portion of said magazine having side walls which are inwardly adjacent to the container side walls and are located immediately above that portion of said conveyor means which is arranged to support the bottom wall of an empty container before the conveyor means begins to move the container downwardly with reference to said magazine.

4,487,002

AUTOMATIC GROUND SPEED CONTROLLER

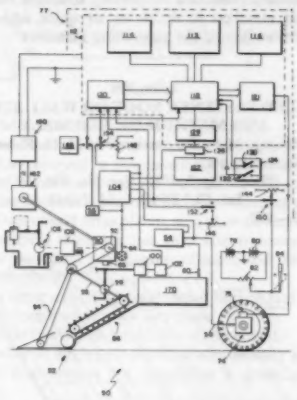
James W. Kruse, Farmington, Mich.; Gary W. Krutz, 605 Northridge Dr., West Lafayette, Ind. 47906, and Larry F. Huggins, West Lafayette, Ind., assignors to Gary W. Krutz, West Lafayette, Ind.

Continuation of Ser. No. 284,359, Jul. 17, 1981, abandoned. This application Jun. 9, 1983, Ser. No. 502,719

Int. Cl.³ A01D *41/00*

U.S. Cl. 56—10.2 **8 Claims**

1. In a combine having an engine, a feeder conveyor, a threshing rotor, means for coupling the threshing rotor to the engine for driving the threshing rotor, and means for coupling the feeder conveyor to the engine for driving the feeder conveyor, an automatic control for combine ground speed comprising means for sensing the mass of a crop being harvested on the feeder conveyor and for generating a signal related thereto, means for sensing the engine speed and for generating a signal related thereto, means for generating a desired engine speed signal, means for generating a maximum combine ground speed signal, a controller, means for coupling the feeder crop mass sensing means to the controller, means for coupling the engine speed sensing means to the controller, means for coupling the desired engine speed signal generating means to the controller, means for coupling the maximum combine ground speed signal generating means to the controller, means for varying the ground speed of the combine in response to a first speed control signal, and means for coupling the combine ground speed varying means to the controller, the controller including means for establishing a first set-point indicative of the presence of a crop being harvested on the feeder conveyor, the controller including means for comparing the feeder crop



mass sensing means signal to the first set-point and means for comparing the engine speed signal to the desired engine speed signal, the comparing means generating the first speed control signal primarily in response to the maximum combine ground speed signal when the comparison of the feeder crop mass sensing means signal with the frist set-point indicates that the mass of a crop being harvested is generally less than the limit established by the first set-point and generating the first speed control signal primarily in response to the comparison of the desired engine speed signal with the actual engine speed signal limited by the maximum combine ground speed signal when the comparison of the feeder crop mass sensing means signal with the first set-point indicates that the mass of a crop being harvested on the feeder conveyor is generally greater than the limit established by the first set-point.

4,487,003

MULTIPLE ROTOR MOWERS

Bernard C. Mathews, Crystal Lake, Ill., and Violet E. Matthews, administrator, 8606 Rte. 176, Crystal Lake, Ill. 60014

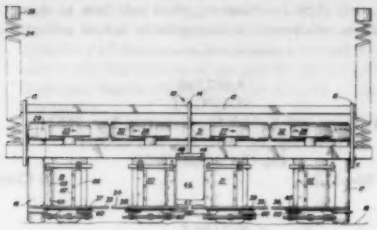
Filed Mar. 2, 1983, Ser. No. 471,264

Int. Cl.³ A01D *35/26*

U.S. Cl. 56—13.6 **33 Claims**

16. In a mower having a plurality of substantially side-by-side vertically disposed rotors, the improvement comprising: each of said rotors having a horizontally disposed bracket at its lower end and a disc comprising segmented portions, each said disc portion readily detachably fastened to said horizontal bracket and said portions extending radially outwardly around said bracket forming a substantially horizontal plane segmented disc, said segmented discs of said plurality of rotors being all disposed in substantially the same horizontal plane, the diameters of each of said segemented discs being such that the circumferences of adjacent segmented discs have a short space therebetween; and a plurality of cutting members associ-

ated with each of said rotors, each said cutting member comprising a horizontally disposed blade portion extending radially beneath said segmented discs and a vertically disposed



mounting portion extending upwardly along said rotor and having adjustable mounting means in the upper portion thereof providing vertical adjustment of said horizontally disposed blade portions beneath said segmented discs.

4,487,004

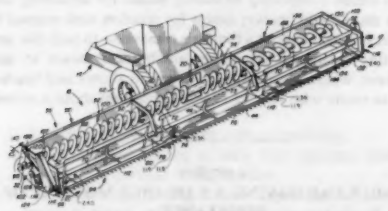
COMBINE HARVESTER APPARATUS

Melvin P. Kejr, Rte. 1, Brookville, Kans. 67425

Filed Jun. 3, 1983, Ser. No. 500,896

Int. Cl.³ A01D *41/14, 45/30, 55/02*

U.S. Cl. 56—14.4 **16 Claims**



1. In a combine harvester apparatus having a tractor assembly and a forward elevator assembly adapted to receive severed crops and convey same upwardly into the tractor assembly, the invention comprising a cutting mechanism assembly; comprising:

a. a center platform assembly secured forwardly of the tractor assembly;

b. another platform assembly pivotally connected to said center platform assembly;

c. said center platform assembly includes a center support frame; a center auger assembly connected to said support frame; and a center sickle assembly connected to said support frame;

d. said another platform assembly includes another support frame; and another auger assembly connected to said another support frame; and an another sickle assembly connected to said support frame;

e. connector means interconnecting said center auger assembly to said another auger assembly for conjoint rotational movement and pivotal movement;

f. said connector means interconnecting said center sickle assembly to said another sickle assembly for conjoint reciprocal movement and pivotal movement;

g. power means connected to said another auger assembly to rotate same and to said another sickle assembly to reciprocate same;

h. control means connected to said center platform assembly and said another platform assembly and operable to pivot said another platform assembly about said center platform assembly; and

i. said pivotal connections of (1) said another platform assembly to said center platform assembly; (2) said another auger assembly to said center auger assembly to; and (3) said another sickle assembly; to said center sickle assembly all being in a common plane;

whereby said another platform assembly is pivotal upwardly and downwardly about said pivotal connections in said common plate to compensate for uneven terrain.

4,487,005

DRAWING ROLLER WITH CONTROLLED DRAWING FINGERS FOR AGRICULTURAL MACHINE

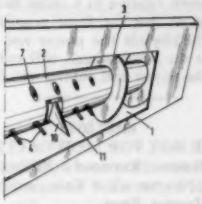
Helmut Claas, and Heinrich Ostrup, both of Harsewinkel, Fed. Rep. of Germany, assignors to Claas OHG., Harsewinkel, Fed. Rep. of Germany

Filed Aug. 5, 1982, Ser. No. 405,337

Claims priority, application Fed. Rep. of Germany, Aug. 5, 1981, 8122977[U]

Int. Cl.³ A01D *57/00*

U.S. Cl. 56—14.5 **6 Claims**



1. A drawing roller of a cutting trough of an agricultural machine, particularly a harvester thresher, comprising a drawing roller body rotatably mounted in a cutting trough and having a central region and two other ends; oppositely operating screw plates arranged at said outer ends of said roller body; a plurality of controlled drawing fingers arranged on said roller body in said central region, said drawing fingers being substantially effective for high product, but in the event of harvesting of low and dry product being usually adjustable to provide optimal receipt of the low and dry product into the trough, which however leads to insufficient low and dry product discharge; and at least one rigid driving member arranged on said roller body in said central region in addition to said controlled driving fingers, said driving member being substantially not effective for high product, but being effective for discharge of low product, so that the same roller having a simultaneously said drawing fingers and said driving member is usable effectively for both low and high products.

4,487,006

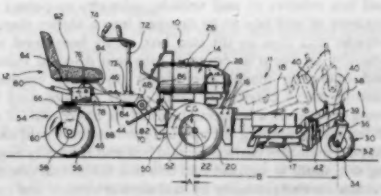
LAWN MOWER

Dane T. Seag, P.O. Box 589, Elm Grove, Wis. 53122

Filed Apr. 15, 1983, Ser. No. 485,319

Int. Cl.³ A01D *35/262*

U.S. Cl. 56—14.7 **7 Claims**



1. A lawn mower comprising a riding unit and a power and cutting unit having a front and rear, a pair of drive wheels

mounted for rotation on the power and cutting unit about a first axis extending adjacent to the rear thereof,

additional wheel means mounted adjacent the front of said power and cutting unit,

said riding unit including a frame having a pair of forwardly extending arms, said arms being pivotally coupled to said power and cutting unit about a second axis parallel to the first axis,

the second axis being located closer to said first axis than said additional wheel means,

said power and cutting unit including a cutting assembly and a drive assembly having an engine coupled to said drive wheels and to said cutting assembly,

said power and cutting unit having a support means extending upwardly therefrom and rearwardly relative to said engine,

winch means and an idler sheave mounted on said riding unit frame,

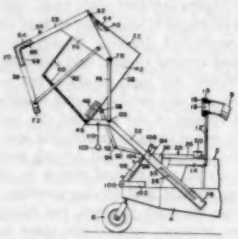
a cable extending from said winch means and around said idler sheave and extending to a point of attachment on said support means and along a line oriented at an angle of about 90 degrees relative to a radial line extending from said first axis so that the force required to rotate said winch and thereby tilt the power and cutting unit upwardly about the drive wheels will remain substantially constant as the power and cutting unit is tilted.

4,487,007

STORAGE BOX FOR MOWER CLIPPINGS

David L. Mullet, Hesston; Raymond J. Rilling, Moundridge, and Elmer D. Voth, Newton, all of Kans., assignors to Excel Industries, Inc., Hesston, Kans.

Filed Jun. 27, 1983, Ser. No. 507,926
Int. Cl.³ A01D *35/22*
U.S. Cl. 56—16.6 **6 Claims**



1. In combination with a lawnmower vehicle comprising a mowing machine and means operable to deliver clippings cut by said mowing machine through a suitable conduit:

a. a box for receiving said clippings carried by said vehicle for elevation from a horizontal base position relative to said vehicle, and for tilting movement on a horizontal axis to dump its contents,

b. means interconnecting said conduit to said box whereby to deliver said clippings thereto, and

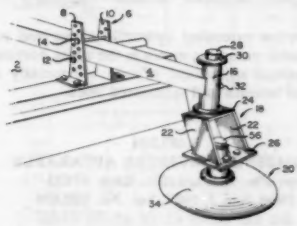
c. operating means operable when actuated first to elevate said box relative to said vehicle, whereby to permit the contents of said box to be dumped into a higher disposal vehicle, and then to tilt said box on its horizontal axis, whereby to dump its contents into said disposal vehicle, said operating means comprising upwardly extensible slide members carried by said mower vehicle, said box being pivoted on a horizontal axis to the upper ends of said slides, means limiting the upward movement of said slides, support members carried by said box and normally engaging said slides to support said box in a horizontal position, a crank carried pivotally by said mower vehicle and operable when turned in one direction to apply upward pressure to said box in spaced relation from its pivotal connection to said slides, but with a lesser moment arm relative to the box pivots than the box itself has to its pivots, whereby initial movement of said crank functions to elevate said box by extending said slides, but without tilting said box, until said slides reach the upper limit of their movement, and only then functions to pivot said box to dump its contents, and power means operable to turn said crank.

4,487,008

SUPPORT

Julian W. Terry, 303 E. 16th St., Cameron, Tex. 76520

Filed Sep. 24, 1982, Ser. No. 425,041
Int. Cl.³ A01D *35/00*
U.S. Cl. 56—17.2 **10 Claims**



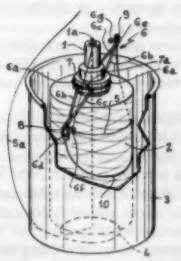
1. A support for an implement comprising a convex disc, bracket means comprising mounting means for mounting said convex disc to said bracket means for rotation with respect to said bracket means about a first axis transverse to said disc and supporting means for attaching said bracket means to said implement, wherein said supporting means allows said bracket means to rotate with respect to said implement about a second axis.

4,487,009

SPINDLE CAP HAVING A VARIABLE MOMENT OF RESISTANCE

Adalbert Winkelmann, Caluire, France, assignor to Verdol S.A., Caluire, France

Filed Feb. 25, 1983, Ser. No. 469,670
Claims priority, application France, Mar. 3, 1982, 82 03872
Int. Cl.³ D01H *7/86, 1/10, 13/10*
U.S. Cl. 57—58.86 **2 Claims**



1. In a double twist spindle of the type having a rotating shaft with a central bore extending therethrough and the shaft supporting a yarn bobbin which rotates therewith, an improved spindle cap and yarn guide comprising:

(a) a hub having a bore therethrough rotatably mounted on the spindle shaft;

(b) two arms carried by the hub and extending diametrically oppositely therefrom adjacent to the bobbin, the outer ends of the arms remote from the hub carrying yarn guide

means for receiving yarn from the bobbin and guiding it to the bore in the spindle shaft; and

(c) a loop comprising a funicular strand of elastic material extending from the arms and having its ends fixed thereto, the loop leaving the arms in a direction parallel to the spindle shaft and having a portion which lies in a plane normal to the spindle shaft and partially surrounds the periphery of the yarn on the bobbin and rubs thereagainst and brakes the rotation of the spindle cap with a frictional resistance that is a function of the diameter of the yarn on the bobbin.

4,487,010

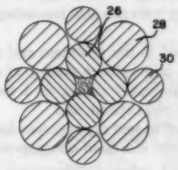
MULTI-LAYER, PARALLEL LAY, CORELESS WIRE ROPE

Ferdinand Chiappetta; John H. Simpson, and Neville H. Simpson, all of Kenosha, Wis., assignors to AMSTED Industries Incorporated, Chicago, Ill.

Filed Feb. 18, 1983, Ser. No. 467,970

Int. Cl.³ D07B *1/06, 1/16, 7/12*

U.S. Cl. 57—213 **7 Claims**



1. A multilayer parallel wire rope comprising:

(a) an inner rope having at least four separate strands arranged in a coreless configuration

(b) an outer rope having at least eight separate strands of large diameter strand and alternate strands of smaller diameter strands of substantially equal diameter as said strands of said inner rope laid on said inner coreless rope; and

(c) filler wire strands located between said inner rope and said outer rope.

4,487,011

PROCESS FOR MAKING A TEXTURIZED PROFILE YARN, AND THE RESULTING YARNS

Karl Heinrich, Grossaitingen, and Norbert Heichlinger, Königsbrunn, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Apr. 12, 1982, Ser. No. 367,168

Claims priority, application Fed. Rep. of Germany, Apr. 18, 1981, 3115759

Int. Cl.³ D02G *3/02, 1/02*

U.S. Cl. 57—247 **7 Claims**

1. In a process for making texturized multifilament yarns with profiled filaments the filament-forming substance of which consists of high-molecular weight polyesters, by means of false twist texturizing, the improvement comprises simultaneously false twist texturizing and drawing without reduction of the twist number feed yarns which are highly pre-oriented multifilament yarns which have a birefringence of more than 65×10^{-3}, while heating the yarns at no more than 30° C. above the glass transition temperature of the polymer.

4,487,012

METHOD AND APPARATUS FOR SUPPLYING FLUID TO A TRAVELING-TYPE WORKING MACHINE SERVING A SPINNING FRAME

Mitsunori Horiuchi, Kariya; Tatemi Fukuda, Aichi; Shigeru Muramatsu, Okazaki, and Takayuki Morita, Kariya, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan

Filed Dec. 23, 1982, Ser. No. 452,802

Claims priority, application Japan, Dec. 29, 1981, 56-214819

Int. Cl.³ D01H *15/00*

U.S. Cl. 57—261 **8 Claims**

1. A method for supplying operational fluid to a working machine, which travels on a rail arranged along the sides of a parent machine, such as a spinning frame, provided with a plurality of spinning units and which serves said parent machine by carrying out a specific operation, said method comprising the steps of

stopping said working machine in front of one of said spinning units necessitating the service of said working machine,

advancing one or more nozzles provided on said working machine by means of compressed fluid supplied from a secondary fluid tank mounted on said working machine, so as to connect one of said nozzles with one of a number of air intakes provided on said parent machine along said rail at a predetermined distance therebetween, and

supplying operational fluid from a primary fluid source through said connected air intake and nozzle to said working machine so that said working machine can carry out said specific operation, and distributing said operational fluid to said secondary fluid tank.

2. An apparatus for supplying operational fluid to a working machine, which travels on a rail arranged along the sides of a parent machine such as a spinning frame, provided with a plurality of spinning units, and which serves said parent machine by carrying out a specific operation, said apparatus being provided, on one hand, on said parent machine with at least one air intake arranged along said rail and communicating with a fluid source for generating primary compressed fluid, and said apparatus being provided, on the other hand, on said working machine with,

a secondary fluid tank,

at least one nozzle through which said primary compressed fluid is supplied to said working machine, said nozzle being air-tightly engageable with and disengageable from said air intake by advancing and retracting the displacements of said nozzle,

an air cylinder for imparting said displacements to said nozzle with fluid supplied from said secondary fluid tank, and

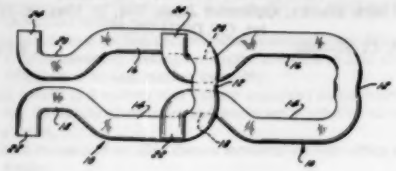
a piping system for distributing said primary compressed fluid to said secondary fluid tank and parts of said working machine so that said working machine can carry out said specific operations.

4,487,013

T-ROD CHAIN

Gail G. Worsley, Hazel Crest, Ill., and Thomas D. Woodward, Munster, Ind., assignors to Agri-Chain Products, Inc., Downers Grove, Ill.

Filed Feb. 22, 1983, Ser. No. 468,112
Int. Cl.³ F16G *15/04*
U.S. Cl. 59—84 **6 Claims**



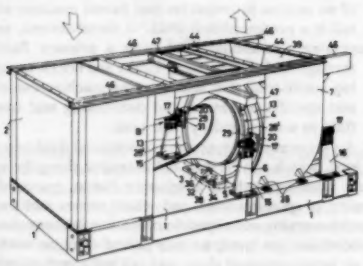
1. A chain link, comprising:
a rod of substantially circular cross-section formed into a generally Omega shape, including:
a transverse bight portion;
a pair of side portions extending therefrom and lying substantially in a plane which is offset below said bight portion;
a pair of curved leg portions extending from said side portions, each of said leg portions first dipping below the plane of said side portions and then curving upward, above the plane of said side portions; and
a pair of foot portions splaying transversely outward from the ends of said leg portions.

4,487,014

GAS GENERATOR AND TURBINE UNIT

Costantino Vinciguerra, Florence, Italy, assignor to Nuovo Pignone S.p.A., Florence, Italy

Filed May 3, 1982, Ser. No. 374,383
Claims priority, application Italy, May 4, 1981, 21493 A/81
Int. Cl.³ F02C *7/20*
U.S. Cl. 60—39.31 **4 Claims**



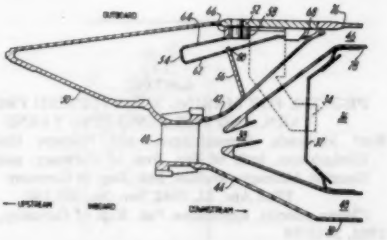
1. A power gas turbine including a gas generator and power turbine having a stator casing and a rotor therewithin, comprising:
a base,
an air intake casing on said base which supports the upstream end of the gas generator wherein the generator has its downstream end rigid with the power turbine,
an exhaust casing having a generally upward outlet, an annular diffuser which receives the gas from the power turbine and discharges it through said outlet, and a support cone connected to said stator casing and said exhaust casing for supporting the stator casing within said exhaust casing,
a support connected to the rotor which supports the rotor in a cantileter manner and which bears on said outside said exhaust casing at the end thereof away from the power turbine,
said exhaust casing is strengthened on its opposing faces by strengthening rings thereon and is supported on said base by means including four parallel pins, two of which are fixed to each strengthening ring on the two faces of said exhaust casings in positions lying on the horizontal plane passing through the turbine axis, bushes for each of said pins fixed to said strengthening rings and into which said pins are inserted, insulating bushes within said fixed bushes and about said pins, four flexible legs, two of which are fixed to said base and connected to said bushes upstream of one face of said casing and the other two of which legs are fixed to said base and connected to said bushes downstream of the other face of said exhaust casing,
an insulating pocket in said exhaust casing which conveys the hot exhaust gas from said diffuser through said outlet and is constructed from plates externally insulated, said pocket having horizontal lugs on the sides thereof which rest by way of insulating material on said exhaust casing in positions lying in the horizontal plane containing the turbine axis, and having an upright key on each face thereof, which key is inserted into a corresponding upright guide on said exhaust casing in a position lying in the vertical plane passing through the turbine axis, the insulating pocket being pressed into the exhaust casing by springs acting between said insulating pocket and exhaust casing,
means connected to the upstream end of said support cone for enabling said exhaust casing to directly support the power turbine stator casing in a manner such that the stator casing can expand, and
means connected to said support case for ensuring the lateral centering of the aforesaid components on said base.

4,487,015

MOUNTING ARRANGEMENTS FOR COMBUSTION EQUIPMENT

Sidney E. Slattery, Foston; Harry Henshaw, Duffield, and Peter Havercroft, Weston on Trent, all of England, assignors to Rolls-Royce Limited, London, England

Filed Feb. 28, 1983, Ser. No. 470,546
Claims priority, application United Kingdom, Mar. 20, 1982, 8208227
Int. Cl.³ F02C *7/20*
U.S. Cl. 60—39.32 **4 Claims**



1. A combustion equipment mounting arrangement comprising:
an annular flame tube;
a support casing spaced radially outboard of said annular flame tube;
a flexible support structure positioned radially between said annular flame tube and said support casing for permitting relative radial movement of said annular flame tube and said support casing, said flexible support structure being U-shaped in section and including a first limb having a

downstream end operatively secured to said annular flame tube, and a second limb secured to said support casing;

an outer diffuser wall spaced radially outboard of said annular flame tube, said outer diffuser wall having a downstream end with an integral arm extending in an upstream direction and secured to said downstream end of said first limb of said flexible support structure;

a plurality of struts extending from said annular flame tube to said outer diffuser wall for operatively securing said annular flame tube to said first limb; and

a plurality of fairings secured to said outer diffuser wall and extending in a radial direction, said first limb of said flexible support structure having a plurality of slots therein for respectively receiving said plurality fairings without said fairings being secured to said first limb of said flexible support structure.

4,487,016

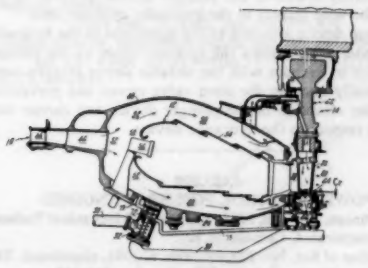
MODULATED CLEARANCE CONTROL FOR AN AXIAL FLOW ROTARY MACHINE

Frederick M. Schwarz, Glastonbury, and James G. Griffin, West Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 1, 1980, Ser. No. 192,743

Int. Cl.³ F02C 7/18

U.S. Cl. 60—204 **8 Claims**



1. In an axial flow gas turbine engine of the type which includes a compression section and a turbine section, the compression section including a rearmost compressor, a discharge region downstream thereof, and a first fluid which is discharged from the rearmost compressor into the discharge region, the turbine section including a coolable outer case having an exterior, a portion of a coolable rotor assembly inwardly of the outer case, the coolable rotor assembly having an array of rotor blades each blade having a tip, a coolable shroud inwardly of the outer case which circumscribes the tips of the rotor blades and which is spaced from the tips of the blades by a radial clearance, the engine further having a second fluid and a means for impinging the second fluid on the exterior of the outer case to adjust the radial clearance between the tips of the rotor blades and the shroud, the engine further including means for modulating the flow of the second fluid as a function of engine temperature, the improvement which comprises:

means for flowing a portion of the first fluid from the discharge region of the rearmost compressor to the coolable rotor assembly;

means for flowing a portion of the first fluid from the discharge region of the rearmost compressor to the coolable shroud; and

means responsive to the temperature of the first fluid for modulating the flow of the second fluid, wherein the means for modulating the flow of the second fluid is responsive to the temperature of the first fluid discharged from the rearmost compressor to take into account the effect that changes in ambient air temperature and component deterioration have on said radial clearance between the rotor tips and the coolable shroud inwardly of the outer case.

4,487,017

EXHAUST MIXER FOR TURBOFAN AEROENGINE

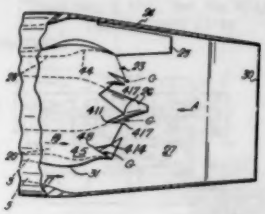
Leonard J. Rodgers, Spondon, England, assignor to Rolls-Royce Limited, London, England

Filed Aug. 13, 1982, Ser. No. 408,133

Claims priority, application United Kingdom, Sep. 3, 1981, 8126750

Int. Cl.³ F02K 3/02

U.S. Cl. 60—262 **9 Claims**



1. For a turbofan aeroengine, an exhaust mixer of the type comprising a plurality of lobes, through which portions of a turbine exhaust stream pass, and a plurality of troughs defined between said lobes, through which troughs portions of a fan air stream pass, said lobes and said troughs being at least partially defined by turbine exhaust stream contacting flow surfaces and fan air stream contacting flow surfaces respectively whereby each said lobe and each said trough has generally opposed sides extending longitudinally of said turbine exhaust and fan air streams, one such side of each of said lobes and troughs comprising a flow surface portion having a longitudinal clockwise progressive twist between its upstream and downstream ends and the other such side of each of said lobes and troughs comprising a flow surface portion having a similar but anticlockwise twist, said flow surfaces being shaped such that latitudinal contours of said flow surfaces at a succession of stations downstream of their upstream ends are sinuous shapes each with a single inflexion, said sinuous latitudinal contours having outwardly convex portions which at least partly delineate outer portions of said lobes, inwardly concave portions which at least partly delineate inner portions of said troughs, and intermediate portions between said outwardly convex and inwardly concave portions, which intermediate portions at least partially delineate said opposed sides of said lobes and troughs.

4,487,018

COMPENSATED FLUID FLOW CONTROL

Tadeusz Budzich, Moreland Hills, Ohio, assignor to Caterpillar Tractor Co., Peoria, Ill.

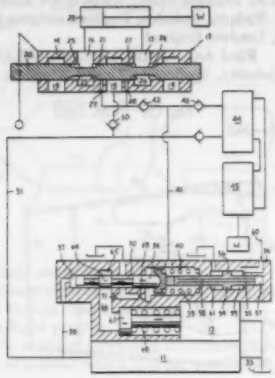
Filed Mar. 11, 1982, Ser. No. 357,034

Int. Cl.³ F15B 13/02

U.S. Cl. 60—452 **14 Claims**

1. A load responsive fluid control system comprising a pump and a fluid motor, control orifice means interposed between said pump and said fluid motor, control means including control member means interposed between said control orifice means and said pump operable to maintain a pressure differential acting across said control orifice means constant at a predetermined level, first force generating means in said control member means responsive to pressure upstream of said orifice means, second force generating means in said control member means responsive to load pressure down stream of said orifice means, third force generating spring biasing means opposing said first force generating means, and fourth force generating means responsive to an external control signal operable to

transmit force to said control member, said fourth force generating means having force balancing means operable to balance force generated by said load pressure, and means operable to generate a force proportional to the magnitude of said external



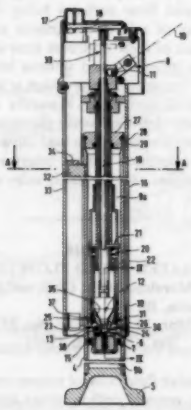
control signal whereby said pressure differential across said control orifice means can be proportionally varied with the magnitude of said external control signal while said pressure differential is maintained constant at each selected level.

4,487,019

HOISTING GEAR AT PATIENT-LIFTING DEVICES

Hans A. V. Johansson, Box 61, Eslov, Sweden S-241 00

Continuation of Ser. No. 256,475, Apr. 22, 1981, abandoned. This application Feb. 22, 1984, Ser. No. 580,786
Claims priority, application Sweden, May 5, 1980, 8003343
Int. Cl.³ F16D *31/02*
U.S. Cl. 60—481 4 Claims



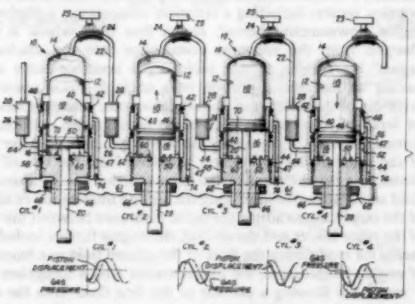
1. A hoisting gear for a patient-lifting device comprising:
(a) an hydraulic cylinder attached to a frame;
(b) a plunger device displaceably mounted within the hydraulic cylinder and dividing the interior of the hydraulic cylinder into an upper chamber and a lower chamber, the plunger device further defining a pumping cylinder;
(c) a carrier tube attached to the plunger device so as to move therewith, the tube surrounding at least a portion of the outer surface of the hydraulic cylinder;
(d) carrier means attached to the carrier tube to support a load thereon;
(e) a pump plunger displaceably disposed within the pumping cylinder;
(f) means to move the pump plunger in a suction stroke and a pumping stroke;
(g) first valve means to allow hydraulic fluid to pass from the upper chamber into the pumping cylinder during the suction stroke of the pump plunger
(h) second valve means to allow hydraulic fluid to pass from the pumping cylinder into the lower chamber during the pumping stroke of the pump plunger so as to elevate the plunger device and carrier tube with respect to the hydraulic cylinder;
(i) third valve means in the plunger device, the third valve means being normally closed to prevent hydraulic fluid from passing from the lower chamber into the upper chamber;
(j) a lowering device comprising:
(i) a sleeve slidably mounted on the plunger device;
(ii) manually actuable pushbutton means attached to the carrier tube; and,
(iii) connecting means connecting the pushbutton means to the slidable sleeve such that, when the pushbutton means is manually actuated, the slidable sleeve opens the third valve means to allow hydraulic fluid to flow from the lower chamber into the upper chamber, thereby lowering the plunger device and the carrier tube with respect to the hydraulic cylinder; and,
(k) a stop device attached to the upper end of the hydraulic cylinder which limits the upward travel of the plunger device by contact with the slidable sleeve thereby automatically opening the third valve means and preventing further elevation of the plunger device and carrier tube with respect to the hydraulic device.

4,487,020

POWER CONTROL FOR HEAT ENGINES

John J. Dineen, Durham, N.H., assignor to Mechanical Technology Incorporated, Latham, N.Y.

Continuation of Ser. No. 232,165, Feb. 6, 1981, abandoned. This application Jul. 21, 1983, Ser. No. 516,323
Int. Cl.³ F02G *1/06*
U.S. Cl. 60—521 15 Claims



1. A power control for a heat engine having an engine block defining therein a cylinder, a piston received within said cylinder in which working gas can expand at the high cycle temperature to produce a power stroke of said piston, and in which said piston can compress working gas at the low cycle temperature in a compression volume, said power control comprising:
a control member disposed in said engine block and movable axially with respect to both said piston and said engine block, wherein said control member is cylindrical and coaxially disposed with respect to said piston, and includes means in said control member defining a cylindrical

bore therethrough, said bore receiving structure attached to said piston;

means defining a gas passage that is positioned to communicate at one end thereof with said compression volume at some positions of said control member and said piston, and to be closed by movement of said piston relative to said control member at other positions of said control member and said piston, wherein said gas passage means is closed at a certain position of said piston stroke by movement of said piston that reduces said compression volume, said certain position being adjustable by adjustment of the position of said control member relative to said engine block;

an enclosed gas volume communicating with said gas passage means at the other end thereof;

a translation mechanism for moving said control member relative to said engine block kinematically independent of the movement of said piston for adjusting the position in said piston stroke when said communication between said gas passage means and said compression volume is closed, whereby the effective volume of said compression volume, and hence the engine power, can be controlled.

4,487,021

RESERVOIR HAVING A LEVEL DETECTOR

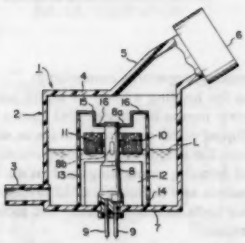
Susumu Arakawa, Chiryu; Tooru Tsukigahora, Toyota, and AKira Shirai, Toyoake, all of Japan, assignors to Aisin Seiki Kabushikikaisha, Kariya and Toyota Jidoshakogyo, Toyota, both of, Japan

Filed Jun. 24, 1982, Ser. No. 391,838

Claims priority, application Japan, Jun. 26, 1981, 56-093880

Int. Cl.³ F16K *24/00;* **H01H** *35/18;* **B60T** *11/26*

U.S. Cl. 60—534 **1 Claim**



1. A hydraulic fluid reservoir including:

a reservoir casing defining an internal area adapted to contain a liquid,

a partition wall formed integrally with the reservoir casing and defining a float chamber interiorly of the reservoir casing and substantially separated from the internal area of the reservoir casing and extending upward from a bottom section of the reservoir casing to form an upper opening of the float chamber,

a rod-like switch casing having a switch or float level sensing means therein and formed integrally with the reservoir casing and extending upwardly from the bottom of the reservoir within the float chamber,

a float disposed in said float chamber and movable upwards and downwards between a lower position and an upper position in response to variations of levels of the liquid so as to cause the switch to close or open at a predetermined float level,

a communication opening communicating the float chamber with said internal area at a lower portion of the partition wall,

a fluid reaction cover plate mounted on the upper end of the switch casing and disposed over the float chamber to cover the upper opening thereof and to provide a gap between the fluid reaction cover plate and the partition wall, the fluid reaction cover plate having through holes therein, and

a stopper plate integral with the switch casing and the reservoir casing, the switch casing extending upward from the bottom of the float chamber and defining the lowest position of the float, the fluid reflection cover plate bifunctionally defining an upper limit stop for the float and preventing substantial variation of the liquid level within the float chamber.

4,487,022

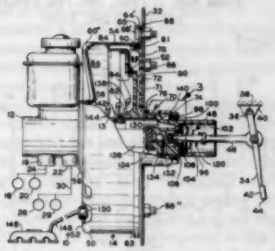
BRAKE ACTUATOR

Oswald O. Kytta, South Bend, Ind., assignor to The Bendix Corporation, Southfield, Mich.

Filed Sep. 1, 1982, Ser. No. 413,865

Int. Cl.³ B60T *13/46*

U.S. Cl. 60—547.1 **3 Claims**



1. A brake actuation assembly comprising:

a master cylinder having a cylindrical body with a shoulder located between a first end and a second end and a bore therein, piston means located in said bore;

a power assist booster having a front shell joined to a rear shell to define a housing, said front shell having an end plate fixed to said shoulder and a cylindrical body attached to said end plate, said cylindrical body having a flange that extends radially outward, said flange having a series of openings therein, said rear shell having a disc with a projection that extends through a first opening in a stationary bulkhead, said disc having a rib adjacent its periphery, said rib having a groove therein, said projection having a second opening therein, a movable wall for separating a first chamber from a second chamber in said housing, said movable wall having a hub member and a diaphragm member, said hub member having an annular projection that extends through said second opening and engages said projection on said rear shell, said hub having a bore therein, said first end of said cylindrical body of said master cylinder extending into said bore and engaging said hub, said hub having a series of grooves through which said first chamber is continually connected to said bore, said diaphragm member having a first bead located in said groove in said rib and a second bead attached to said hub, said first bead engaging said cylindrical body to seal said first and second chambers from the surrounding engagement and for resiliently positioning said cylindrical body in an axial plane with said pistons in said master cylinder, and a valve for controlling flow communication of fluid through said bore between said first and second chambers;

fastener means extending through said opening in said flange to connect said front shell to said stationary bulkhead;

an actuator responsive to an input signal for operating said valve to control the development of a pressure differential between said first and second chambers by interrupting fluid communication to said first chamber and initiating fluid communication to said second chamber with the surrounding environment, said pressure differential acting

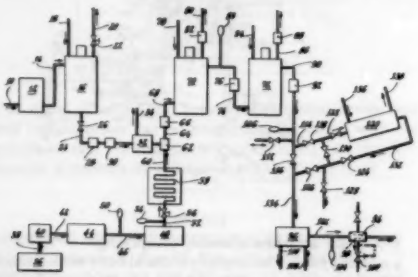
on and moving said wall to produce an output force, the engagement of said cylindrical body and projection on said rear shell holding said hub in said axial plane within said booster to allow said output force to move said piston means in said master cylinder without the development of any lateral forces, said piston means responding to said output force by developing a reaction force, said reaction force being transferred from said master cylinder through said front shell into said stationary bulkhead to substantially eliminate the creation of any axial deformation of said rear shell.

4,487,023

PROCESS FOR PREPARING A GASIFIED ICE PRODUCT

Joseph L. Hegadorn, Ridgewood; Steven B. Chall, Marlboro, and Richard B. Stevenson, Englishtown, all of N.J., assignors to General Foods Corporation, White Plains, N.Y.

Filed Sep. 2, 1982, Ser. No. 414,213
Int. Cl.³ F25C *1/00*
U.S. Cl. 62—1 **15 Claims**



1. A process for preparing gasified ice characterized by a uniform gas content within the range of from about 35 to about 60 milliliters of gas per gram of product and a high degree of mechanical strength in the frozen state, which comprises:

providing a source of water at a temperature below about 5° C.;

providing a source of conditionally-stable-hydrate-forming gas at a temperature of less than about 10° C. wherein all lines for transporting the suspension of gas hydrate crystal-like particles are maintained free of obstructions and are positioned to provide bends of no less than a 6-inch radius;

dispersing the gas within the water at a weight ratio of gas to water within the range of from about 0.14 to about 0.18 to provide a process feed stream;

introducing the process feed stream into a dynamic reaction zone at a temperature within about 1° C. of the hydrate formation equilibrium temperature at a preselected process pressure, within the range of from about 300 to about 450 psig, which is maintained within the dynamic reaction zone;

maintaining contact between the gas and water in the feed stream under dynamic conditions for a period of time of from 2 to 8 minutes and effective to form conditionally-stable gas hydrate and to dissolve gas within the water to an extent effective to provide a uniform, flowable suspension of solid gas hydrate crystal-like particles in a saturated aqueous solution of carbon dioxide;

transporting the suspension to a pressurized freezing vessel which is in communiction with the dynamic reaction zone and a pressure control means, comprises an elongated cylinder positioned at an angle of from 0° to 30° from the horizontal, and valve means and means for separating occluded gas from liquid and solid components, said pressure control means being capable of controlling the system pressure to within 5 psig of the pre-selected pressure;

closing the freezing chamber; and,

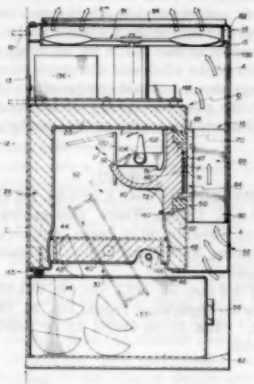
freezing the suspension under pressure.

4,487,024

THERMOELECTRIC ICE CUBE MAKER

Charles J. Fletcher, Sparta, and Everett Moshier, Hamburg, both of N.J., assignors to Clawson Machine Company, Inc., Franklin, N.J.

Filed Mar. 16, 1983, Ser. No. 475,822
Int. Cl.³ F25B *21/02*
U.S. Cl. 62—3 **22 Claims**



1. An ice making apparatus comprising:

mold means for holding a body of liquid water;

thermoelectric means for freezing at least a portion of said body of liquid water so as to form ice in said mold means;

harvest means for removing said ice from said mold means;

an insulated housing containing said mold means and said harvest means and defining a cold storage bin for receiving said ice upon its removal from said mold means by said harvest means;

said insulated housing including an insulated door having a closed position for supporting said removed ice as it accumulates in said cold storage bin and an open position for discharging said accumulated ice from said cold storage bin;

control means for preventing removal of said ice from said mold means by said harvest means when said cold storage bin is full of said accumulated ice; and,

drive means for causing said insulated door to move between said closed position and said open position so as to discharge said accumulated ice from said cold storage bin.

4,487,025

PASSIVE BOOSTER FOR PUMPING LIQUIFIED GASES

Syed Hamid, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Apr. 18, 1983, Ser. No. 485,805
Int. Cl.³ F17C *13/00*
U.S. Cl. 62—54 **19 Claims**

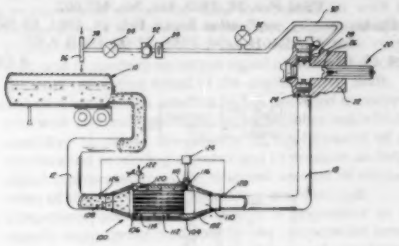
1. An apparatus adapted to inhibit vaporization of a pressurized substantially liquified gas of the type employed in treatment of oil and gas wells, comprising:

heat exchanger means adapted to receive and discharge a flow of said substantially liquified gas from a liquified gas source at a well site;

tube side means associated with said heat exchanger means

adapted to conduct at least substantially most of said flow of said substantially liquified gas through said heat exchanger means;

shell side means associated with said heat exchanger means in heat transferring communication with said tube side means and



variable throttling valve means adapted to lower the temperature of at least partially liquified gas introduced into said shell side means below that of said substantially liquified gas flow through said tube side means.

4,487,026

REFRIGERATION SYSTEM ENERGY MANAGEMENT CONTROL DEVICE AND METHOD

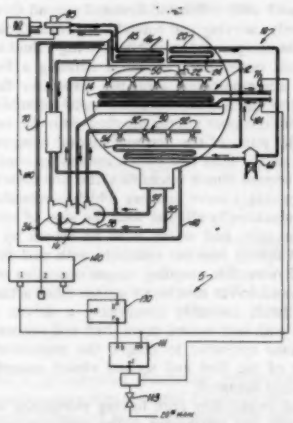
Vincent J. Alfano, 15735 James, Southgate, Mich. 48195

Filed Mar. 12, 1982, Ser. No. 357,360

The portion of the term of this patent subsequent to Apr. 6, 1999, has been disclaimed.

Int. Cl.³ F25B *15/00*

U.S. Cl. 62—101 **6 Claims**



1. A control system for controlling the refrigeration capacity of a refrigeration system in operative relation to control the temperature of a fluid medium for the climate control of building air in response to dynamic operating variations which effect temperature changes in said fluid medium, said refrigeration system comprising:

a source of refrigerant;

evaporator means for vaporizing said refrigerant and causing said refrigerant vapor into heat transfer relationship with said fluid medium to be cooled, said evaporator means having an inlet for receiving said fluid medium to be cooled and an outlet for discharging cooled fluid medium from said evaporator means;

condenser means for causing said refrigerant into heat transfer relationship with a cooling medium which extracts heat from said refrigerant vapor thereby condensing said refrigerant vapor to liquid form;

refrigerant distribution means operatively communicating with said condenser means to raise the pressure of said refrigerant vapor, said refrigerant distribution means further communicating with said evaporator means to receive said refrigerant vapor therefrom, said refrigerant distribution means further having refrigerant control means, said refrigerant control means comprising:

means for generating a first signal responsive to variations in the temperature of said fluid medium for the climate control of building air;

generating means for generating a second signal at a predetermined level, said generating means comprising a minimum position switch means connected to said refrigerant control means for terminating the operative effect of said first signal means wnen said first signal is less than said second signal at said predetermined level;

means for generating a third signal responsive to the variation in temperature of said fluid medium in said evaporator means outlet, said third signal being communicated to said refrigerant control means; and

controller means connecting said first and third signals for providing a fourth signal as a function of said first and third signals, said fourth and second signals further being connected to said minimum position switch means for continuously controlling said refrigerant distribution means, said minimum position switch means further selecting the greater of said fourth and second signals dependent on its relative value as compared to the lesser of said fourth and second signals to control the refrigerant distribution means thereby continuously controlling said refrigerant distribution means as a function of said fluid medium temperature in said evaporator means inlet on a real time basis.

4,487,027

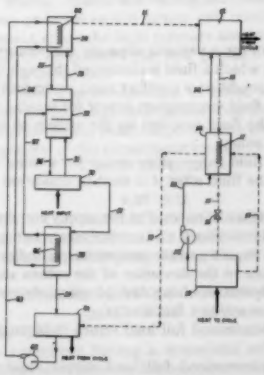
HYPERABSORPTION SPACE CONDITIONING PROCESS AND APPARATUS

Robert A. Macriss, Deerfield, and Thomas S. Zawacki, Oak Park, both of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Continuation-in-part of Ser. No. 365,792, Apr. 5, 1982, Pat. No. 4,413,480. This application Nov. 7, 1983, Ser. No. 549,461

Int. Cl.³ F25B *15/00*

U.S. Cl. 62—112 **20 Claims**



1. In a closed cycle space conditioning process of the type comprising the steps of sequentially absorbing a refrigerant vapor in a liquid in an absorber zone with removal of heat energy from the cycle, passing said absorbed refrigerant vapor

in said liquid to a generator zone and heating said absorbed refrigerant vapor in said liquid causing vaporization freeing said refrigerant vapor from liquid, passing said refrigerant vapor to a condenser zone condensing said refrigerant vapor to a refrigerant liquid with removal of heat energy from the cycle, passing said condensed refrigerant liquid through a pressure reduction zone vaporizing said condensed liquid, passing said refrigerant vapor to an evaporator zone and heating said refrigerant vapor by addition of heat energy to the cycle, and passing said heated refrigerant vapor to said absorber zone for repeat of the cycle, the improvement comprising:

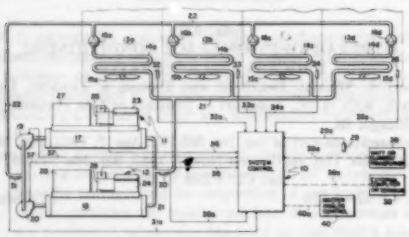
maintaining in a closed cycle a substantially saturated salt working solution of a salt having an exothermic heat of crystallization between at least one pair of (1) said absorber and said generator and (2) said condenser and said evaporator, passing a slurry of solid phase of said salt in a solution of said salt to at least one of said absorber and condenser of said pair(s) wherein said solid phase salt is dissolved to form said substantially saturated salt working solution, and passing said substantially saturated salt working solution to at least one of said generator and evaporator of said pair(s) wherein crystallization of said salt from said working solution to form a solid phase salt produces exothermic heat of said crystallization which is utilized to aid said refrigerant vaporization.

4,487,028

CONTROL FOR A VARIABLE CAPACITY TEMPERATURE CONDITIONING SYSTEM

David M. Foye, La Crosse, Wis., assignor to The Trane Company, La Crosse, Wis.

Filed Sep. 22, 1983, Ser. No. 534,849
Int. Cl.³ F25B 7/00
U.S. Cl. 62—115 **26 Claims**



1. A control for a variable capacity temperature conditioning system in which a fluid is circulated through the system to temperature condition a comfort zone, comprising

a. a supply fluid temperature sensor for sensing the temperature of the fluid supplied by the system to condition the comfort zone;

b. a return fluid temperature sensor for sensing the temperature of the fluid after it is used to condition the comfort zone;

c. control means connected to the supply and the return fluid temperature sensors, said control means being operative to vary the capacity of the temperature conditioning system in response to the deviation of the return and the supply fluid temperatures from desired values determined by the control means as a function of

i. a predetermined full load return fluid temperature setpoint;

ii. a predetermined full load supply fluid temperature setpoint;

iii. a predetermined full load reference fluid temperature setpoint; and

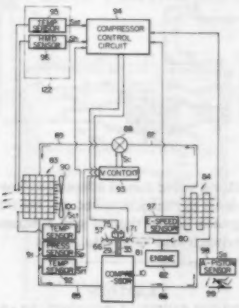
iv. the relative loading of the temperature conditioning system.

4,487,029

VARIABLE-DISPLACEMENT ROTARY FLUID COMPRESSOR AND AIR CONDITIONING SYSTEM USING THE COMPRESSOR

Yoshiaki Hidaka, Yokohama, and Yasuhiro Niikura, Yokosuka, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Feb. 18, 1983, Ser. No. 467,602
Claims priority, application Japan, Feb. 24, 1982, 57-29234
Int. Cl.³ B60H 3/04; F25B 27/00; F04B 9/00
U.S. Cl. 62—133 **4 Claims**



3. An air conditioning system for a vehicle having an internal combustion engine and an acceleration producing member, comprising in combination

a variable-displacement rotary fluid compressor comprising at least two rotary compressor assemblies consisting of first and second rotary compressor assemblies including respective rotor units rotatable about axes substantially aligned with each other and first and second drive shafts respectively carrying and rotatable with said rotor units, each of the compressor assemblies having a fluid inlet port and a fluid outlet port; members defining a fluid inlet chamber communicating with the respective fluid inlet ports of the first and second compressor assemblies and a fluid outlet chamber communicating with the respective fluid outlet ports of the first and second compressor assemblies; and at least two clutch assemblies consisting of first and second clutch assemblies, the first clutch assembly comprising a drive member which is rotatable about an axis substantially aligned with the axes of rotation of said rotor units and which is to be driven by a drive source, a driven member rotatable with said first drive shaft and releasable coupling means operative to couple the drive and driven members together when actuated, the second clutch assembly comprising a driven member rotatable with said second drive shaft and releasable coupling means operative to couple the respective driven members of the first and second clutch assemblies together when actuated;

a refrigerant evaporator core having refrigerant inlet and outlet ports, the refrigerant outlet port communicating with said fluid inlet chamber of the rotary fluid compressor;

a refrigerant condenser core having refrigerant inlet and outlet ports, the refrigerant inlet port of the condenser core communicating with the fluid outlet chamber of the rotary fluid compressor;

an expansion valve unit having a refrigerant inlet port communicating with the refrigerant outlet port of the condenser core and a refrigerant outlet port communicating with the refrigerant inlet port of said evaporator core;

a conditioned-air temperature sensor which is positioned to be responsive to the temperature of air in the vehicle room and which is operative to detect the temperature of the air circulated through said evaporator core and to produce an

output signal representative of the detected temperature of the conditioned air;

a conditioned-air humidity sensor which is positioned to be responsive to the temperature of air in the vehicle room and which is operative to detect the humidity of the air circulated through the evaporator core and to produce an output signal representative of the detected humidity of the conditioned air;

an engine-speed sensor provided in conjunction with the output shaft of the internal combustion engine and operative to detect the revolution speed of the engine output shaft and to produce an output signal representative of the detected revolution speed of the engine output shaft;

an accelerator-position sensor which is provided in conjunction with an acceleration producing member and which is operative to detect the amount of displacement of the acceleration producing member and to produce an output signal representative of the detected amount of displacement of the acceleration producing member; and

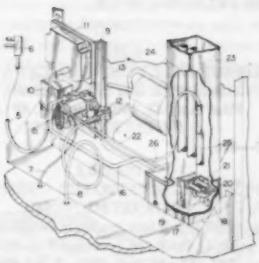
a compressor control circuit which is responsive to the signals respectively produced by the temperature sensor, humidity sensor, engine-speed sensor and accelerator-position sensor and which is operative to determine, on the basis of these signals, whether only one of said first and second clutch assemblies is to be coupled or both of the first and second rotary clutch assemblies are to be coupled.

4,487,030

GAS/ELECTRIC OPERATED ABSORPTION REFRIGERATOR HAVING AUTOMATIC FLAME DETECTION AND RESTART CAPABILITY WITH VISUAL INDICATION OF OPERATING STATUS

Randy E. Carter, Waynesfield, and Ernst R. Schmidt, Sidney, both of Ohio, assignors to The Stolle Corporation, Sidney, Ohio

Filed Aug. 8, 1983, Ser. No. 521,189
Int. Cl.³ F25B *15/00*
U.S. Cl. 62—141 **14 Claims**



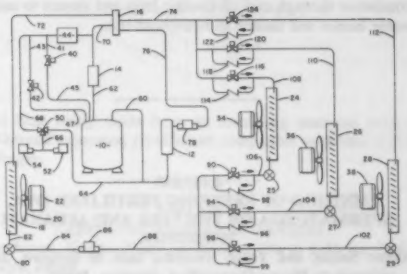
1. In a gas operated absorption refrigeration apparatus of the type having a heat operated generator and a flammable gas burner for supplying heat to the generator, the improvement in combination therewith comprising means for monitoring the presence or absence of the burner flame and visually perceptible electrically operated lamp means responsive to said monitor means for providing an indication of the absence of flame at the burner when the refrigeration apparatus is calling for cooling, said refrigeration apparatus comprising a box-like enclosure defining an upper freezer compartment and a lower cold food compartment, each of said compartments having a vertically mounted hinged outwardly opening door, said lamp means being mounted on said enclosure above said freezer compartment door so as to be visible from the front of the refrigerator enclosure and comprising a first indicator for providing a visible indication when said heater is selected, a second indicator for providing a visible indication when said burner is selected, and a third indicator for providing a visible indication of the absence of said flame at the burner when said burner is selected, each of said indicators being of a different color, and an electrically operable resistance heater for supplying heat to said generator, and means for selecting said heater or said burner.

4,487,031

METHOD AND APPARATUS FOR CONTROLLING COMPRESSOR CAPACITY

Richard D. Rogers, East Syracuse, and Harold H. Hopkinson, Manlius, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Oct. 11, 1983, Ser. No. 540,268
Int. Cl.³ F25B *13/00*
U.S. Cl. 62—160 **19 Claims**



1. A refrigeration circuit including an outdoor heat exchanger, an indoor heat exchanger and variable capacity compressor means, a discharge line connected to the variable capacity compressor means for receiving refrigerant at high pressure and a suction line connected to the compressor means for conducting refrigerant to the compressor at a relatively lower pressure, and means for changing the capacity of the compressor means which comprises:

a capacity pressure switch means for indicating a need to effect a change in the capacity of the compressor upon a selected refrigerant pressure level being detected;

a control valve connected via a high pressure conduit to direct refrigerant between the discharge line and the control valve, connected via a low pressure conduit to direct refrigerant between the suction line and the control valve and a sensing conduit connecting the control valve to the capacity pressure switch means, said control valve acting to connect either the high pressure conduit to the sensing conduit or to connect the low pressure conduit to the sensing conduit; and

a control means interconnected to effect a change in the capacity of the compressor means upon the capacity pressure switch means indicating a need to effect a change in the capacity of the compressor means.

4,487,032

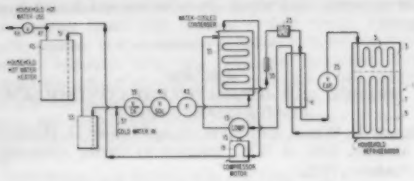
ENERGY CONSERVATION FOR HOUSEHOLD REFRIGERATORS AND WATER HEATERS

Terry L. Speicher, 2262 King James Ct., Winter Park, Fla. 32792

Filed Apr. 1, 1983, Ser. No. 481,254
Int. Cl.³ F25B *39/04*
U.S. Cl. 62—183 **7 Claims**

1. In a household having a household refrigerator and a household hot water heater, fed by a source of cold water, the refrigerator having a closed refrigeration cycle in which a refrigerant flows from a compressor to a condenser to an expander to at least one evaporator of the refrigerator and back to the compressor; the improvement comprising means to

supply water from said cold water source to cool said condenser, means to feed water heated in said condenser to said hot water heater, and means to distribute water from said



heater for household use, said compressor having a compressor motor having an oil cooling loop, said water passing from said condenser through said oil cooling loop and thence to said hot water heater and thence to household use.

4,487,033

METHOD OF FREEZING FERTILIZED OVA, SPERMATOZOA OR THE LIKE AND APPARATUS THEREFOR

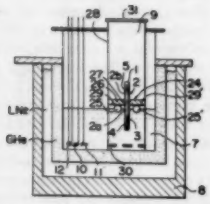
Nobuo Sakao, and Yasuo Kuraoka, both of Sapporo, Japan, assignors to Hoxan Corporation, Sapporo, Japan

Division of Ser. No. 404,400, Aug. 2, 1982, Pat. No. 4,429,542. This application Oct. 26, 1983, Ser. No. 533,932

Claims priority, application Japan, Aug. 10, 1981, 56-124996; Aug. 10, 1981, 56-124997; Sep. 16, 1981, 56-137410[U]; Nov. 18, 1981, 56-184815; Jan. 14, 1982, 57-3761[U]; Mar. 12, 1982, 57-34839[U]

Int. Cl.³ F25D *17/02*

U.S. Cl. 62—373 **7 Claims**



1. An apparatus for freezing fertilized ova, spermatozoa or the like comprising:

a tube containing a first buffer solution containing articles to be frozen such as fertilized ova, spermatozoa or the like and a second buffer solution containing no articles to be frozen, and a refrigerant for cooling the first and second buffer solution,

a low constant temperature tank containing the refrigerant and a cover plate covered thereon,

a guide rod vertically mounted on the cover plate of said tank,

upper and lower mounting members of synthetic resin mounted on said guide rod, and

a slide pin of synthetic resin for holding said tube and elastically urged by a spring downwardly to be elevationally movably mounted at said upper mounting member, thereby elastically holding said tube between said slide pin and said lower mounting member.

4,487,034

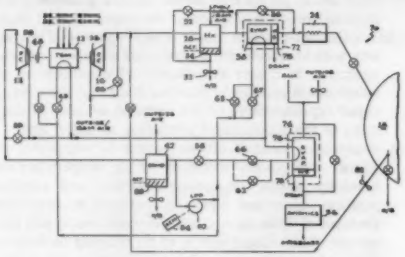
ENERGY-EFFICIENT ALL-ELECTRIC ECS FOR AIRCRAFT

Michael J. Cronin, Sherman Oaks, and Gordon Seid, Los Angeles, both of Calif., assignors to Lockheed Corporation, Burbank, Calif.

Division of Ser. No. 248,603, Mar. 27, 1981, Pat. No. 4,434,624. This application Aug. 3, 1983, Ser. No. 519,798

Int. Cl.³ F25D *9/00*

U.S. Cl. 62—402 **10 Claims**



1. In an aircraft environmental control system having an air cycle cooling system powered by an electrical motor and, an evaporative cooling sub-system coupled thereto, said cooling sub-system having a cooling circuit including fluid coolant, at least one coolant compressor coupled to said electric motor, and at least one coolant expansion means the improvement comprising:

means to selectively disconnect said coolant compressor from said electric motor;

said air cycle cooling system having means to bypass said at least one coolant expansion means and said at least one coolant compressor; and

a liquid coolant pump for circulating said fluid coolant through said cooling circuit.

4,487,035

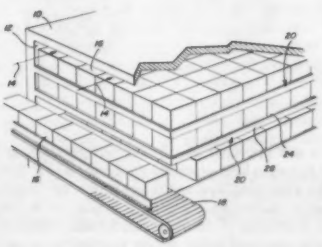
COLD STORAGE CELL FOR REFRIGERATION SYSTEM

Richard C. Greener, P.O. Box 657, Lancaster, Pa. 17604

Filed Apr. 22, 1983, Ser. No. 487,816

Int. Cl.³ F25D *17/04*

U.S. Cl. 62—406 **4 Claims**



1. In a refrigeration system of the type including an air blast cool air circulating system for removing heat from products, that improvement comprising a refrigeration storage cell on which the products are supported during air circulation thereover, said cell including a hollow shell filled with a eutectic solution capable of being frozen at a temperature lower than the freezing temperature of water by the cool air circulating in the refrigeration system in air to surface heat exchange relation thereby enabling the latent heat of fusion of the solution to be used at a temperature lower than the freezing temperature of

water to remove heat from the products stored on the cell in a a rapid and efficient manner by conducting heat from the products into the solution while cool air circulates over the products, said cell including a hollow shell having flat, parallel top and bottom plates of heat conductive material, a peripheral wall connecting the periphery of the plates to form said shell, said eutectic solution including glycol and water, said top plate of the shell including depending, parallel, mutually spaced fins integral therewith for effective heat exchange between the eutectic solution and the shell.

4,487,036

HERMETICALLY CIRCULATING, ABSORPTION TYPE REFRIGERATOR

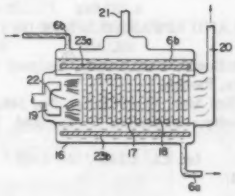
Masahiko Itoh, Hitachiota; Heihatiro Midorikawa; Akira Minato, both of Hitachi, and Kenzi Machizawa, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 14, 1983, Ser. No. 532,109

Claims priority, application Japan, Sep. 22, 1982, 57-163929

Int. Cl.³ F25B *43/00*

U.S. Cl. 62—474 **5 Claims**



1. In a hermetically circulating, absorption type refrigerator including a regenerator, a condenser, an evaporator, an absorber and a heat exchanger, said refrigerator characterized in that said regenerator has an absorbing solution heating tube flux provided between two tube plates encased within a shell; non-soluble electrodes are disposed between each of said tube plates and said shell; and an anti-corrosive current is made to flow through at least one of an end portion of the heating tube of said heating tube flux, said tube plates and said shell.

4,487,037

SMALL-SIZED CRYOSTATIC DEVICE FOR PHOTODETECTORS

Jacques Meignin; Daniel Mollaret, and Roger Prost, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Jul. 8, 1983, Ser. No. 512,147

Claims priority, application France, Jul. 16, 1982, 82 12467

Int. Cl.³ F25B *19/00*

U.S. Cl. 62—514 R **17 Claims**

1. A cryostatic device of small dimensions for photodetectors comprising:

a photodetector,

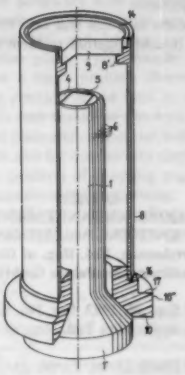
a finger adapted to be brought to a very low temperature with said detector fixed at one end of said finger,

an external housing surrounding said finger and detector, said external housing having a window in a wall facing the detector, said window being made of a material transparent to radiation to be detected,

a base sealed to said finger and to said external housing and forming a vacuum enclosure between said finger and said housing,

electric conductors extending from said photodetector at said one end of said finger, along the finger to the other end thereof and exiting between the base and the finger,

said finger being made of a tight ceramic or a sealed ceramic of a low thermal conductivity, and



said base being made from an insulating material with a thermal expansion co-efficient compatible with that of the finger.

4,487,038

LAMINATE TYPE EVAPORATOR

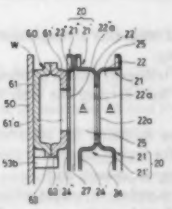
Takeo Iijima, Konan, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Apr. 22, 1983, Ser. No. 487,505

Claims priority, application Japan, Apr. 24, 1982, 57-59812[U]

Int. Cl.³ F25B *39/02*

U.S. Cl. 62—515 **20 Claims**



1. A laminate type evaporator comprising:

a plurality of hollow bodies, each having a pair of stamped plates abutting against each other and joined together, and defining two tanks therein at opposite end portions thereof and a multiplicity of passages therein at an intermediate portion thereof, said passages communicating the interiors of said tanks with each other, said tanks of adjacent ones of said hollow bodies at each of said opposite end portions thereof communicating with each other;

a plurality of fins, said hollow bodies and said fins bein alternately superposed;

a pair of end plates attached to opposite outermost ones of said hollow bodies, at least one of said end plates having a plurality of locating projections projected toward a corresponding one of said opposite outermost hollow bodies; and

first and second pipe means interposed between said at least one end plate and said corresponding one outermost hollow body, for introducing refrigerant into said evaporator and discharging refrigerant therefrom, respectively, said first and second pipe means each comprising a pair of semitubular members abutting against each other and

joined together, said first and second pipe means being retained in respective predetermined locations by said locating projections;

said hollow bodies, said fins and said first and second pipe means being brazed together to form an integral body.

4,487,039

WEFT MAGAZINE ARRANGEMENT FOR WARP KNITTING MACHINES

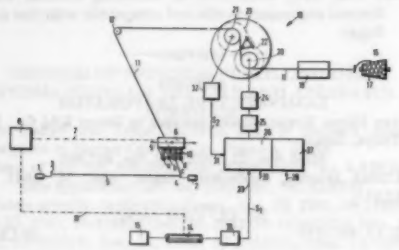
Ingo Mayer, Obertshausen, Fed. Rep. of Germany, assignor to Karl Mayer Textilmaschinenfabrik GmbH, Fed. Rep. of Germany

Filed Sep. 20, 1983, Ser. No. 534,127

Claims priority, application Fed. Rep. of Germany, Sep. 21, 1982, 3234827

Int. Cl.³ D04B *23/06, 23/08, 23/10, 23/12*

U.S. Cl. 66—84 A **16 Claims**



1. A weft thread magazine arrangement for a warp knitting machine comprising:

a spaced pair of transport means positioned on either side of said machine for carrying the weft thread into said machine;

a carriage means mounted for transverse reciprocation at said machine for laying successive rows of the weft thread onto said transport means; and

delivery means coupled to said machine and responsive to the motion of said carriage means for issuing the weft thread to said carriage means at an variable issue speed having a predetermined relationship to the position and speed of said carriage means.

4,487,040

SPUN POLYESTER WARP KNIT

Shantilal G. Patel, Clifton, N.J., and William D. Bell, Warwick, N.Y., assignors to International Playtex, Inc., Stamford, Conn.

Filed Oct. 30, 1981, Ser. No. 316,799

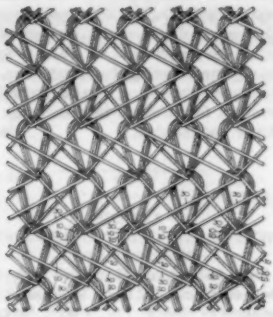
Int. Cl.³ D04B *21/00*

U.S. Cl. 66—195 **8 Claims**

1. A moldable fabric having improved hand comprising spun yarn of polyester staples warp knitted on a 28 needle per inch warp knitting machine,

said yarn being no coarser than 60 single spun count,

said yarn formed from single staples having a length in the range of about 1.5 to about 2 inches and a denier of less than 2,



said yarn having a twist in the range of 24 to 36 twists per inch, and said yarn being waxed and steamed.

4,487,041

METHOD AND APPARATUS FOR DRYING MOIST SKINS

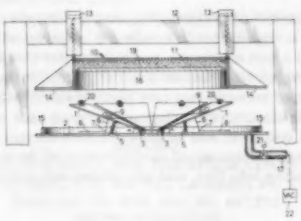
Jean-Pierre duBourg, Gex, France, assignor to Patpan, Inc., Panama City, Panama

Filed Mar. 20, 1981, Ser. No. 246,092

Claims priority, application Switzerland, Mar. 27, 1980, 2397/80

Int. Cl.³ C14B *1/26, 1/40*

U.S. Cl. 69—1 **7 Claims**



1. An apparatus for stretching and drying a moist skin having a center comprising:

a planar base member having a center;

a plurality of sector plates each having a plurality of perforations formed therein and pivotally connected to said planar base member about a pivot axis disposed proximate to said center of said planar base member and parallel or coincident with said planar base member;

spring means operatively associated with said plurality of sector plates for biasing said plurality of sector plates away from said planar base member;

limiting means for limiting said spring means such that each of said plurality of sector plates forms a mutually equal angle with respect to said planar base member;

a plurality of clamps operatively associated with said plurality of perforations formed in each of said plurality of sector plates for securing said skin at substantially geometrically opposed peripheral stretching points of said skin and for attaching said skin to each of said plurality of sector plates at points from said center of said skin proportional to the distance between said opposed peripheral stretching points, such that pivoting of said plurality of sector plates against said spring means and toward said planar base member effects said stretching proportional to the distance between said opposed peripheral stretching

points, and such that said center of said skin is disposed adjacent said center of said planar base member upon completion of said pivoting;

a cover member having means for resisting subatmospheric pressures and for completely covering said plurality of sector plates;

a fluid tight seal surrounding said plurality of sector plates for forming a hermatically sealed enclosure around said plurality of sector plates upon contact with said cover member;

means disposed within said enclosure for heating said skin to a temperature below 75° C.; and

means for generating a sub-atmospheric pressure within the interior of said enclosure.

4,487,042

STEERING LOCK ASSEMBLY

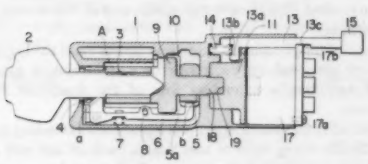
Haruo Mochida; Yoshimitsu Takeda, both of Yokohama; Takeshi Fukasawa, Tokyo; Mikio Masaki, Tokyo; Kiichi Shimizu, Tokyo, and Satoru Kobayashi, Tokyo, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama and Kokusan Kinzoku Kogyo Kabushiki Kaisha, Tokyo, both of, Japan

Filed Feb. 25, 1982, Ser. No. 352,091

Claims priority, application Japan, Feb. 27, 1981, 56-028054; Apr. 7, 1981, 56-052171

Int. Cl.³ B60R *25/04*

U.S. Cl. 70—186 **18 Claims**



1. A steering lock assembly to lock and unlock a steering shaft by use of a key, comprising:

a cylinder lock housing having an ignition switch section on a rear side thereof;

rotor means accommodated within said housing and having a first one-way stop permitting the rotor means to rotate from a lock position to an unlock position but preventing the rotor means from rotating from the unlock position to the lock position;

control means for, during rotation of said rotor means to the unlock position, riding over said first one-way stop and coming into engagement therewith, said control means being biased in a predetermined position to press contact the first one-way stop and including an actuator member having a portion extending back of said ignition switch section; and

a knob coupled to said control means and positioned away from said rotor means, said knob being adapted to be manipulated axially.

4,487,043

PERMUTATION LOCK

Peter Milles, Albertbofen, Fed. Rep. of Germany, assignor to S. Franzen Söhne (GmbH & Co.), Solingen, Fed. Rep. of Germany

Filed Nov. 6, 1980, Ser. No. 204,397

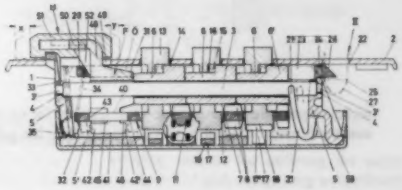
Claims priority, application Fed. Rep. of Germany, Nov. 15, 1979, 2946091

Int. Cl.³ E05B *37/02*

U.S. Cl. 70—312 **10 Claims**

1. In a combination lock having setting discs which are arranged alongside of each other on a shaft, are turnable independently of each other and extend through slots in a front plate of a lock case, having a plurality of aligned locking sleeves associated with the setting discs, seated on the shaft and in spring-biased coupling engagement with the setting discs and formed on their periphery with depressions which, when the combination number is correctly set, are located in a position opposite projections, and having an actuating handle arranged on the front plate, which handle can be displaced longitudinally from a basic position thereof in a direction toward an opening position of the lock in order to release a hasp which extends into inside of the lock case through an opening in the front plate and cooperates with a latch member, the actuating handle also for operatively displacing the locking sleeves out of their position of coupling engagement with the setting discs, the improvement comprising

said actuating handle is mounted displaceably from said basic position thereof in a displacement movement in a



direction opposite the direction toward said opening position of the lock and constitutes means during said displacement movement for pushing the locking sleeves out of said position of coupling engagement,

detent means for holding said actuating handle in said basic position as a detented intermediate position thereof,

said latch member constitutes a latch slide formed with an opening,

a finger extends towards the inside of said lock case and passes with clearance through said opening of said latch slide,

said finger is operatively moveably connected to said actuating handle,

said finger extends inside said lock case in a vicinity around said shaft and in said vicinity forms an abutment surface engaging against an endmost of said locking sleeves.

4,487,044

FRICTION COMPENSATION IN A ROLLING MILL HAVING AUTOMATIC GAGE CONTROL

Donald J. Fapiano, Salem, Va., assignor to General Electric Company, Salem, Va.

Filed Jun. 30, 1983, Ser. No. 509,599

Int. Cl.³ B21B *37/12*

U.S. Cl. 72—8 **20 Claims**

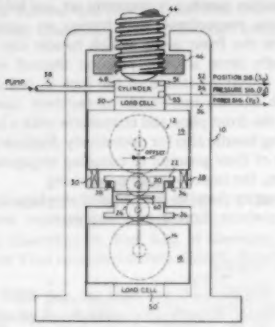
1. In a rolling mill stand including roll elements for reducing the thickness of a workpiece passed therebetween, means for adjusting the gap between the roll elements, means for sensing the roll separation force occasioned by passing the workpiece between the roll elements, means for sensing the roll elements position and automatic gage control means for controlling the means for adjusting the gap as a function of roll separation force, a method of compensating for friction forces within the rolling mill stand occuring as the result of movement of the roll elements so as to improve the stability and accuracy of said automatic gage control comprising the steps:

(a) establishing a friction signal representative of the friction forces;

(b) developing a sensed force signal representing the sensed roll separation force occasioned by passing a workpiece between said roll elements;

(c) developing a velocity signal having a sense and a magnitude representing the velocity of the change of the roll gap; and,

(d) combining said friction signal and said sensed force signal as a function of the sense and magnitude of said velocity



signal to provide a compensated force signal for use by the automatic gage control means in controlling the roll gap.

4,487,045

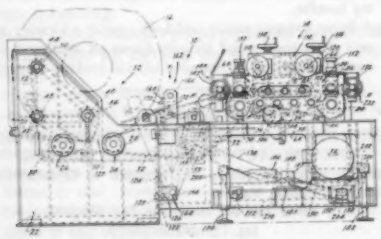
CRADLE STRAIGHTENER FEEDER

Werner K. Lehmann, Birmingham; Robert E. Lamey, Southfield, and Karl Lehmann, Dearborn Heights, all of Mich., assignors to Sesco, Inc., Detroit, Mich.

Filed Nov. 23, 1981, Ser. No. 323,830

Int. Cl.³ B21D *55/00*; B21B *45/02*

U.S. Cl. 72—43 **21 Claims**



1. An apparatus for feeding a coil of sheet metal to an accessory unit, comprising:

cradle means for holding said coil in a selected position, said cradle means having a longitudinal centerline and including drive means for rotating said coil, said drive means contacting said coil solely at the outside periphery of said coil, said coil having a longitudinal centerline;

straightener means for forwardly feeding said sheet metal to said accessory unit along the centerline of said coil in a series of feed strokes, and said straightener means having a longitudinal centerline;

means for directing said sheet metal from said cradle means to said straightener means; and

means for cross-feeding said sheet metal to said accessory unit wherein on each feed stroke said centerline of said coil is moved from one side to the other side and back to said one side of a reference line parallel to said centerline of said straightener means.

4,487,046

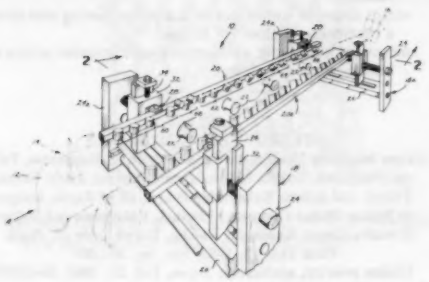
TRANSITION FORMING SECTION FOR TUBE MILL

Nelson D. Abbey, III, Toledo, Ohio, assignor to Abbey Etna Machine Co., Perrysburg, Ohio

Continuation of Ser. No. 396,305, Jul. 8, 1982, abandoned. This application Jul. 27, 1984, Ser. No. 635,471

Int. Cl.³ B21D *5/08*

U.S. Cl. 72—52 **5 Claims**



1. A transition forming unit having a longitudinally extending axis for producing a tubing of annular cross-sectional configuration from a strip of U-shaped cross-sectional configuration traveling along the longitudinal axis of the forming unit, comprising:

a pair of longitudinally extending beams each having an axis, one disposed on each side of and extending along the longitudinally extending axis of the transition forming unit;

a plurality of spaced apart roll assemblies extending longitudinally along each of said beams, each of said roll assemblies including at least one roller adapted to engage the outer surface of the strip being formed and a separate first adjustment means for moving said roller to a predetermined position relative to the axis of said beam on which said roll assembly is mounted; and

second adjustment means for vertically and horizontally moving said beams to orient the axes of the beams in selected positions relative to the axis of the forming unit, said second adjustment means operable to simultaneously adjust the vertical positions of said roll assemblies relative to the axis of the forming unit and to simultaneously adjust the horizontal portions of said roll assemblies relative to the axis of the forming unit while maintaining each of said rollers of said roll assemblies in said predetermined positions relative to the axes of said beams.

4,487,047

THIN-WALL SPLINE FORMING

James T. Killop, Warren, Mich., assignor to Anderson-Cook, Inc., Fraser, Mich.

Division of Ser. No. 239,266, Mar. 2, 1981, Pat. No. 4,380,918. This application Mar. 28, 1983, Ser. No. 479,183

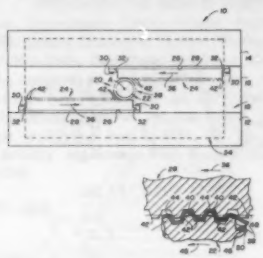
The portion of the term of this patent subsequent to Apr. 26, 2000, has been disclaimed.

Int. Cl.³ B21D *9/14*, *17/00*, *53/28*

U.S. Cl. 72—88 **1 Claim**

1. A method for forming splines in a thin-wall sleeve of a power transmission member, said method comprising: mounting the sleeve of the power transmission member on a mandrel including teeth having a pitch circle; rotatably supporting the mandrel about a rotational axis between a pair of racks including teeth having pitch lines that are tangent to the mandrel pitch circle; and moving the racks in opposite directions as

each other to mesh the rack teeth and the mandrel teeth with the sleeve therebetween to form splines that are located one-



half radially inward of the mandrel pitch circle and one-half radially outward of the mandrel pitch circle.

4,487,048

METHOD AND APPARATUS FOR BEADING THE BODIES OF SHEET METAL CANS

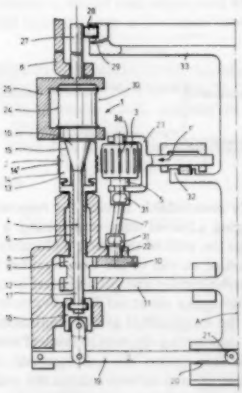
Siegfried Frei, St. Gallen, Switzerland, assignor to Cantec Inc., Forth Worth, Tex.

Filed May 3, 1982, Ser. No. 374,147

Claims priority, application Fed. Rep. of Germany, May 12, 1981, 3118783

Int. Cl.³ B21D *15/00*

U.S. Cl. 72—94 **15 Claims**



1. A method of beading the bodies of metal containers, especially sheet metal cans, for the purpose of increasing the strength thereof, comprising the steps of:

providing an inner tool and an outer tool between which there is beaded the container body by performing a rolling operation;

fixedly clampingly retaining for rotation the container body by means of projections on the inner tool substantially coaxially with respect to the inner tool and over a predetermined axial length of said container body;

radially advancing the outer tool towards the inner tool so as to engage the container body over said predetermined axial length thereof; and

rolling the outer tool upon the inner tool and the intermediately situated container body in order to bead the container body over said predetermined axial length thereof.

4,487,049

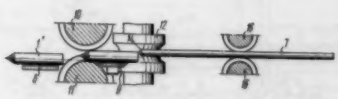
WORKING MANDREL AND METHOD OF ROLLING ELONGATE HOLLOW PIECES IN A MULTI-STAND CONTINUOUS MILL ON SAME WORKING MANDREL

Valentin N. Danchenko; Alexandr A. Zayats, both of Dnepropetrovsk; Ivan N. Potapov, Moscow; Petr M. Finagin, Moskovskoi, and Sergei P. Kutsenko, Dnepropetrovsk, all of U.S.S.R., assignors to Dnepropetrovsky Metallurgichesky Institut, Dnepropetrovsk, U.S.S.R.

Filed Aug. 4, 1981, Ser. No. 290,009

Int. Cl.³ B21B *17/04*

U.S. Cl. 72—208 **16 Claims**



7. A working mandrel comprising:

a mandrel bar;

a body having a working surface for defining the inner surface of a piece to be rolled and comprising at least two equally long sections, one of which engages with said mandrel bar;

each said section having a leading end wherein a socket is provided and a trailing end having a portion axially projecting beyond the working surface being at least partially a counterpart of the socket and loosely received into the socket of the adjacent section;

the working surface, when the working mandrel is in centerline with a multi-stand rolling mill during the rolling operation, extending at least the distance between the first and the last roll stands and the distance the leading section travels while a single piece is being rolled.

15. A method of rolling elongate hollow pieces in a multi-stand continuous mill, comprising the steps of:

positioning an elongate hollow piece in front of the rolling mill comprising at least two roll stands;

providing a mandrel comprising a mandrel bar and a working mandrel comprising at least as many equally long sections as there are roll stands in the multi-stand continuous mill and having a working surface, when the working mandrel is in centerline with the mill during the rolling operation, extending at least the distance between the first and the last roll stands and the distance the leading section travels, while a single piece is being rolled, each section having a socket in the leading end thereof and a portion axially projecting beyond the working surface on the trailing end thereof, the projecting portion being at least partially a counterpart of the socket on the leading end and being loosely received in the socket of the adjacent section, by positioning at least one prepared section of the working mandrel of said mandrel in front of the first roll stand and at least one between the first and the last roll stands and by moving the nose of the mandrel bar into the socket of the leading working mandrel;

feeding said elongate hollow piece into the first roll stand, then

rolling said elongate hollow piece by reducing it in section on a single section of the working mandrel of said mandrel per roll stand, the section travel being controlled by a backpressure exerted by said mandrel bar;

withdrawing the leading section of the working mandrel of said mandrel from the rolled hollow piece after the step of rolling and

transferring at least one withdrawn section to a mandrel preparation line.

4,487,050

ROLLING MILL

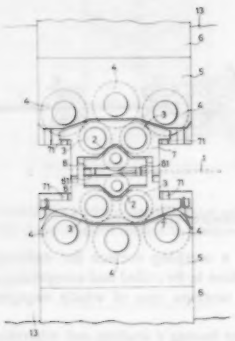
Tetsuo Kajiwara; Kazuyoshi Hashimoto, both of Hiroshima; Takao Kawanami, Kitakyushu, and Koichi Mori, Tokai, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha and Nippon Steel Corporation, both of Tokyo, Japan

Filed May 13, 1982, Ser. No. 377,943

Claims priority, application Japan, May 21, 1981, 56-75663

Int. Cl.³ B21B *31/20, 13/14*

U.S. Cl. 72—243 **6 Claims**



1. In a rolling mill in which at least one of paired work rolls that roll metal strips is formed to have a small diameter as can be bent more easily than the work roll in a conventional 4-stage rolling mill and is backed up by a pair of separate intermediate rolls spaced laterally apart and contacting said small diameter work roll at angularly spaced locations on said work roll which in turn are backed up by a plurality of separate, spaced backup rolls; the improvement comprising: each of said backup rolls is subdivided in the axial direction into spaced backup roll portions, each said backup roll portion is in contact with at least one of said intermediate rolls, a first bearing case containing a bearing is provided to each end of the small diameter work roll and a second bearing case containing bearings is provided to each end of the pair of intermediate rolls supporting the small diameter work roll so that these rolls are supported on the bearing cases through said bearings; and means for applying independent roll bending forces to the work roll bearing cases and to the intermediate roll bearing cases.

4,487,051

PRESS APPARATUS

Kuniharu Iwamoto, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Dec. 17, 1982, Ser. No. 450,803

Claims priority, application Japan, Jun. 17, 1981, 56-089317[U]

Int. Cl.³ B21D *11/04*

U.S. Cl. 72—312 **4 Claims**

1. A press apparatus, comprising:

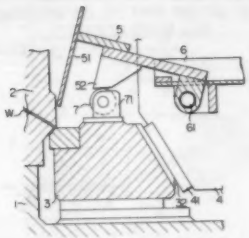
a lower die for receiving a workpiece;

an upper die movable in direction towards said lower die to clamp said workpiece in cooperation with said lower die;

a lateral pressing cam mechanism including a fixed cam movable in a single plane parallel to said upper die, and a slidable cam in cooperation with said fixed cam movable substantially laterally with respect to the movement of the upper die as said fixed cam is moved, thereby effecting work on said workpiece clamped between said upper and lower dies;

guide means for selectively registering said workpiece on said lower die prior to said slidable cam beginning work on said workpiece, said guide means having at its one end a guide portion for registering said workpiece and a pivot at its other end mounted on a supporting member extending from said lower die; and

mutually cooperating cam means provided on a portion of



said slidable cam and a portion of said guide means, said mutually cooperating cam means causing said guide means to be pivoted on said pivot as said slidable cam undergoes movement.

4,487,052

DEVICE AND METHOD FOR REMOVING IRREGULARITIES IN OR ENLARGING AN UNDERGROUND DUCT

Ian R. Yarnell, Unit 106B Blackdown Industries, Haste Hill, Haslemere, Surrey GU27 2HA, England

Filed Jun. 15, 1983, Ser. No. 504,603

Claims priority, application United Kingdom, Jun. 18, 1982, 8217645

Int. Cl.³ B21D *41/02*

U.S. Cl. 72—393 **15 Claims**

1. A remotely controllable device for removing irregularities in or enlarging a buried duct, comprising: a base member shaped to engage the wall of the duct; a plurality of leaf members in the region of an end of the base member and arranged substantially symmetrically around a central longitudinal axis, each leaf member being mounted for movement transversely with respect to the longitudinal axis; a longitudinally mounted ram; and means connecting the ram to the leaf members so that operation of the ram causes the leaf members to move outwardly away from the axis to bear against the wall of the duct.

13. A method of removing irregularities in or enlarging a buried duct by remote control, comprising: (i) providing a remotely controlled device inside the duct, the device comprising a base member, a plurality of leaf members arranged symmetrically around a longitudinal axis of the device and pivotally attached to the base member, and a tapered expander member longitudinally movable relative to the base member for moving the leaf members between a retracted position in which they form a tapered nose portion and an expanded position in which they form a substantially cylindrical surface corresponding to the required size of the duct; (ii) providing means for remotely controlling movement of the wedge and means for driving the device along the duct; (iii) driving the device through the duct with the leaf members leading and in their retracted position; (iv) when resistance to movement of the device reaches a given level, remotely expanding the leaf members to push the wall of the duct outwardly to reduce the resistance to movement; (v) returning the leaf members to their

retracted position, and repeating steps (iii) and (iv) until the required length of duct has been traversed.

4,487,053
WINDSHIELD WIPER YOKE

Kurt Bauer, Ingersheim; Georg Hesch, Sachsenheim; Hans Huber, Bietigheim-Bissingen; Helmut Markert, Pleidelsheim, and Christian Roth, Bietigheim-Bissingen, all of Fed. Rep. of Germany, assignors to ITT Industries, Inc., New York, N.Y.

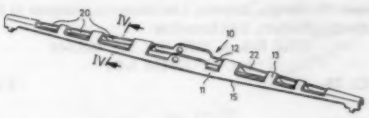
Division of Ser. No. 78,939, Sep. 26, 1977, Pat. No. 4,309,790, and a continuation of Ser. No. 299,728, Sep. 8, 1981, abandoned.

This application Aug. 8, 1983, Ser. No. 521,011

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1978, 2843249

Int. Cl.³ B21D *53/88*

U.S. Cl. 72—335 **3 Claims**



1. A method for manufacturing a windshield wiper yoke having a pair of lateral shanks and a connecting web and slots in said web extending in width into said lateral shanks for use in a wiper blade assembly, said method including the steps of:

punching a blank from a single relatively thin sheet of metal, said blank being in the shape of a flattened yoke having a pair of lateral shanks and a connecting web;

punching slots in said web, said slots extending in width into said lateral shanks;

holding said blank in a die to prevent lateral deflection in the areas of said lateral shanks adjacent said slots while simultaneously stamping the edges of said slots adjacent said lateral shanks to round said edges; and

bending said blank to form a U-shaped cross-section.

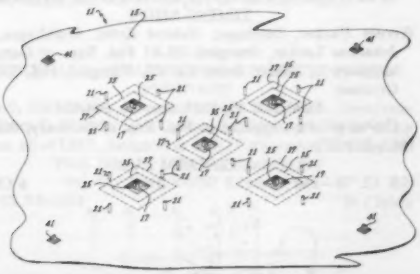
4,487,054
METHOD FOR PROJECTING LANDFILL GAS COLLECTION RATE OF A SURFACE COLLECTOR

Stanley W. Zison, Irvine, Calif., assignor to Getty Synthetic Fuels, Inc., Signal Hill, Calif.

Filed Jun. 8, 1983, Ser. No. 502,092

Int. Cl.³ G01N *7/14*

U.S. Cl. 73—19 **15 Claims**



1. A method of projecting the landfill gas collection rate of a surface collector from a region of a landfill wherein the landfill comprises refuse covered by a layer of cover material, said method comprising:

removing portions of the cover material from said region of the landfill in a plurality of removal stages to provide at least one exposed test area and to make an incremental enlargement of the test area in each successive removal stage;

measuring the venting rate of the landfill gas through the test area under essentially steady state pressure conditions following each of a plurality of removal stages; and

using the measured venting rates for projecting the approximate collection rate for a surface collector at said region of the landfill.

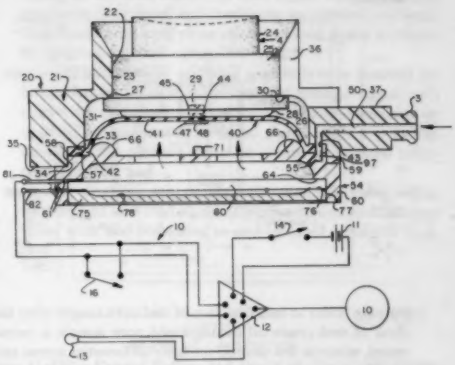
4,487,055
BREATH ALCOHOL TESTING DEVICE

Karl Wolf, Webster Groves, Mo., assignor to Alcotek, Inc., Webster Groves, Mo.

Filed Sep. 20, 1982, Ser. No. 419,972

Int. Cl.³ G01N *1/14*

U.S. Cl. 73—23 **3 Claims**



1. In a breath alcohol testing device designed to determine blood alcohol concentrations, said device including breath-receiving means, a fuel cell chamber communicating with said breath-receiving means, a fuel cell within said chamber and a movable wall in the form of a diaphragm mounted adjacent said fuel cell to be moved reciprocably between a down position at which the wall is relatively close to the fuel cell and an up position at which the wall is relatively far from the fuel cell, the movement of said wall acting to pump breath to and from said fuel cell, the improvement comprising said movable wall defining one wall of said fuel cell chamber, whereby breath in the space between said movable wall and said fuel cell is in substantially unrestricted communication with said fuel cell, [The device of claim **2** including] a set button biased away from said fuel cell and mounted to be movable toward and away from said fuel cell, a connector connecting said button to the diaphragm, said connector having a guide well in it opening through a lower surface, a spider between said fuel cell and said diaphragm, and a guide post, carried by said spider and positioned and proportioned to extend into said guide well when said button is moved to its position near said fuel cell, said spider having legs defining between them spaces sufficiently large as to constitute no barrier to unrestricted communication with the fuel cell of breath in the space between the diaphragm and the fuel cell.

4,487,056
DETERMINATION OF THE IMBIBITION CHARACTERISTICS OF A ROCK FORMATION

Bruce F. Wiley, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 282,307, Jul. 10, 1981, abandoned. This application Sep. 28, 1982, Ser. No. 427,258

Int. Cl.³ G01N *15/08*

U.S. Cl. 73—38 **20 Claims**

1. A method for determining the imbibition characteristics of a core sample, having first and second faces, at an elevated temperature and elevated pressures comprising the steps of:

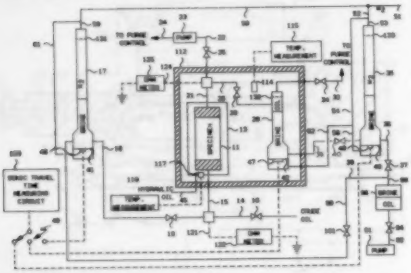
heating said core sample to a desired temperature;

applying a first pressure to the fluid contained in said core sample so as to apply a desired pore pressure to said core sample;

applying a second pressure to the surface area of said core sample so as to apply a desired overburden pressure to said core sample, wherein said second pressure is greater than said first pressure;

passing a crude oil having a desired gas concentration through said core sample, wherein the passing of said crude oil through said core sample is terminated after said core sample has reached a desired state of crude oil saturation;

establishing a desired differential pressure across said core sample;



supplying water to said first face of said core sample after the flow of said crude oil through said core sample is terminated, wherein the desired pressure differential across said core sample is a pressure differential which will enable said water to be imbibed by said core sample to thereby force said crude oil from said core sample; and

measuring the rate at which said crude oil is forced from said core sample to thereby determine the imbibition characteristics of said core sample.

4,487,057

CONTINUOUS SENSE AND LOCATE DEVICE

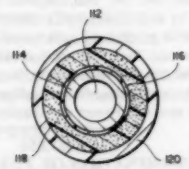
Michael A. Lutz, San Carlos, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 184,647, Sep. 16, 1980, abandoned, which is a continuation-in-part of Ser. No. 134,354, Mar. 27, 1980, abandoned, which is a continuation-in-part of Ser. No. 88,344, Oct. 26, 1979, abandoned. This application Jul. 30, 1982, Ser. No. 403,891

The portion of the term of this patent subsequent to Nov. 30, 1999, has been disclaimed.

Int. Cl.³ G01M *3/04*; G01R *31/08*

U.S. Cl. 73—40.5 R **17 Claims**



1. A liquid fluid fault detecting and locating sensor comprising:

(a) an electrical conductor, said conductor selectively connectable to a capacitance measuring device;

(b) a dielectric material in contact with said electrical conductor;

(c) a solid conductive polymeric composition having conductive particles therein in contact with said dielectric material and separated from said electrical conductor by said dielectric material, said solid conductive polymeric composition being normally conductive and being capable of a massive increase in resistivity upon exposure to a liquid fluid fault condition at any location along said solid conductive polymeric composition where a fault condition occurs, the solid conductive polymeric composition capable of swelling when exposed to liquid fluid resulting in separation of the conductive particles causing a resultant massive increase in resistance, said solid polymeric composition selectively connectable to a capacitance measuring device so that the capacitance between said electrical conductor and said solid conductive polymeric composition is measurable before and during exposure to a fluid fault condition, the ratio of said capacitance measurements determining the location of a liquid fault condition.

4,487,058

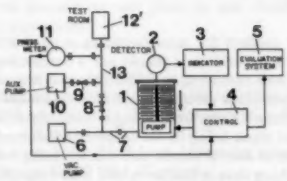
METHOD AND APPARATUS FOR DETECTING GAS LEAKS

Hermann Mennenga, Balzers, Liechtenstein, assignor to Balzers Aktiengesellschaft, Liechtenstein

Filed Feb. 3, 1983, Ser. No. 463,646

Int. Cl.³ G01M *3/04*

U.S. Cl. 73—40.7 **9 Claims**



1. A method of detecting leaks of a gas in a vessel, comprising: connecting the vessel containing the gas to be detected to a vacuum pump, the connection also being connected to a turbo-molecular pump for pumping the gas in a pump direction; sensing, with a detector, the gas from the vessel which passes through the turbo-molecular pump in a direction opposite to the pump direction; regulating a pumping speed of the pump so that the detector gives off a signal of a predetermined size; and thereafter adjusting the pumping speed to maintain the signal as a measure of gas leaking into the vessel.

4,487,059

CIRCUIT FOR PRODUCING PULSES INDICATIVE OF SPEED FROM A ROTARY GENERATOR WITHOUT TIMING SHIFT

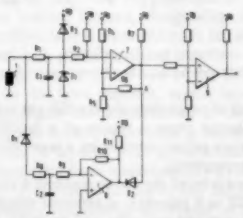
Werner Fischer, Ditzingen; Helmut Kniss, Waiblingen, and Johannes Locher, Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jun. 15, 1983, Ser. No. 504,474

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1982, 3226073

Int. Cl.³ G01M *15/00*

U.S. Cl. 73—116 **6 Claims**



1. Apparatus for producing, from the output of an inductive generator, a sequence of electric signals of substantially rectangular time profile which is representative of rotary speed, comprising a threshold switch stage having its input connected to receive signals from said generator, said threshold switch

stage having switch-in and switch-out thresholds, and further comprising:

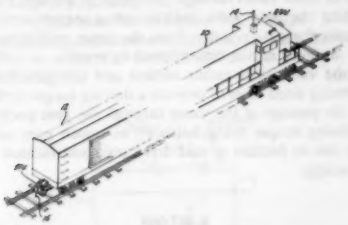
means for applying, to said threshold switch stage, a bias proportional to the amplitude of the signals received from said generator for progressively raising said switch-in threshold while leaving said switch-out threshold fixed.

4,487,060

RAILWAY BRAKE PRESSURE MONITOR

Richard J. Pomeroy, West Vancouver, Canada, assignor to Glenayre Electronics, Ltd., Vancouver, Canada

Filed May 18, 1983, Ser. No. 495,714
Int. Cl.³ G01L *5/28*
U.S. Cl. 73—129 **29 Claims**



1. A railway brake pressure monitor comprising:

a sensor/transmitter unit constructed so as to be mounted on the last vehicle of a railway train and coupled with the brake pipe of the last vehicle, said sensor/transmitter unit including: means for providing an output signal proportional to the air pressure within the brake pipe; means for repetitively monitoring said output signal to measure the value of said brake pipe air pressure; means for storing said brake pipe air pressure value; means for transmitting a report including said brake pipe air pressure value as currently stored; and, means for enabling the transmission of said report in response to the occurrence of a predetermined event; and,

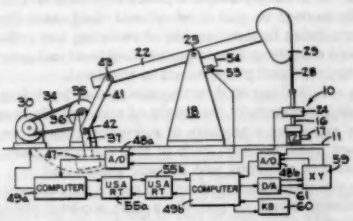
a remote display unit constructed so as to be mounted in the locomotive of the railway train, said remote display unit including: means for receiving each said report from said sensor/transmitter unit; means for extracting said brake pipe air pressure value from each said report; and, means for displaying said brake pipe air pressure value.

4,487,061

METHOD AND APPARATUS FOR DETECTING WELL PUMP-OFF

Louis S. McTamaney, Cupertino; Allan B. Delfino, Sunnyvale; Delbert F. Waltrip, and Thomas I. Kirkpatrick, both of San Jose, all of Calif., assignors to FMC Corporation, Chicago, Ill.

Filed Dec. 17, 1982, Ser. No. 450,597
Int. Cl.³ F04B *49/00*; E21B *44/00*
U.S. Cl. 73—151 **31 Claims**



1. Apparatus for monitoring the operation of a well pumping unit having a sucker-rod string and a power unit to reciprocate said rod string to produce fluid from an underground location, said apparatus comprising:

first transducer means for generating a signal representative of a load on said rod string;

second transducer means for generating a signal representative of a position of said rod string;

means for using a maximum value and a minimum value of said load signal to establish a selected value corresponding to said load signal, and for using a maximum and a minimum value of said rod signal to establish a reference position of said rod string;

means for periodically updating said selected value by combining an updated maximum load signal with a previous maximum load signal and combining an updated minimum load signal with a previous minimum load signal to obtain an updated selected value;

means for periodically updating said reference position by combining an updated maximum rod position signal with a previous maximum rod position signal and combining an updated minimum rod position signal with a previous minimum rod position signal to obtain an updated reference position; and

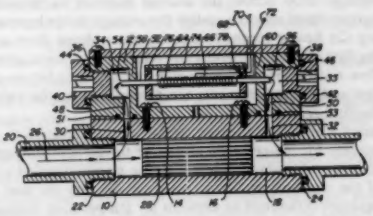
means for disabling said power unit when said value corresponding to said load signal exceeds said updated selected value with said rod string at said updated reference position.

4,487,062

MASS FLOWMETER

John G. Olin, Carmel Valley, and David M. Korpi, Monterey, both of Calif., assignors to Sierra Instruments, Inc., Carmel Valley, Calif.

Filed Mar. 30, 1983, Ser. No. 480,231
Int. Cl.³ G01F *1/68*
U.S. Cl. 73—202 **6 Claims**



1. A mass flowmeter for sensing the fluid flow rate in a flow line comprising:

means defining a primary passage for the flow of the gas;

means defining a secondary passage for the flow of the gas, the secondary passage communicating with the primary passage at an upstream and a downstream location, said secondary passage further comprising a straight sensor tube displaced from and generally parallel with the primary passage;

means proximate the secondary passage for applying heat at a relatively constant rate to the fluid flowing through the secondary passage;

means connected to the heat-applying means for measuring the temperature differential of the fluid flowing through the secondary passage caused by the addition of heat;

removable means proximate the ends of the sensor tube for providing access to the sensor tube without removing the primary passage means from the flowline; and

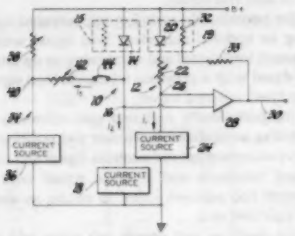
means engageable with the sensor tube when the access providing means is removed for cleaning the interior of the sensor tube, said cleaning means including means for sealing the interior of the sensor tube from fluid communication with the primary passage.

4,487,063

SOLID STATE MASS AIR FLOW SENSOR

Daniel H. Hopper, Peru, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 11, 1983, Ser. No. 512,551
Int. Cl.[3] G01F *1/68*
U.S. Cl. 73—204 3 Claims



1. A mass air flow sensing circuit having solid state flow sensing and temperature compensation elements subject to effects of an airstream being measured and each having a voltage drop dependent on its temperature and the current flow therethrough, comprising;

a first solid state element thermally coupled to heater means for heating to a controlled temperature, a first resistor and a first constant current source in series with the first element,

a second solid state element in series with a second constant current source, the second element being maintained at the ambient temperature of the airstream,

means for comparing the voltage drop across the serial combination of the first element and first resistor with the voltage drop across the second element to provide an output signal and to equalize the voltage drops by energizing the heater means to control the voltage drop across the first element, whereby the output signal for a given air flow and the nominal temperature difference between the first and second elements are determined by the value of the first resistor, and

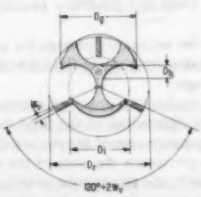
means for adjusting the said temperature difference to compensate for temperature effects of the air and the sensing circuit comprising current altering means coupled to one of the elements or first resistor for altering the said temperature difference as ambient air temperature varies.

4,487,064

INTERNAL GATE ROTARY VANE FLUID METER WITH CONTROLLED ROTOR VANE INNER DIAMETER

Irwin A. Hicks, Radnor, Pa., assignor to The Singer Company, Stamford, Conn.

Filed May 13, 1983, Ser. No. 494,206
Int. Cl.[3] G01F *3/08*
U.S. Cl. 73—253 1 Claim



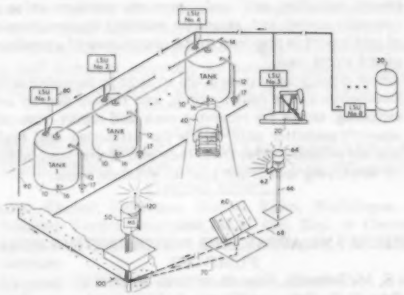
1. In a fluid meter, the combination of a body having an inlet passage and an outlet passage, a crescent shaped member within the body defining therewith an arcuate channel communicating at opposite ends with said passages, respectively, said body and said crescent also defining an offset circular cavity intersecting the channel between the inlet and outlet passages, a rotor mounted on the body for rotation about an axis within the arcuate channel and the offset cavity, said rotor having an end plate and a plurality of vanes fixed on the rotor end plate, said vanes being adapted to move by fluid pressure through said arcuate channel and through said portion of said cavity, a gate mounted in bearings on the body for rotation about an axis parallel to the rotor axis within said offset cavity, said gate having a periphery provided with pockets therein for reception of the rotor vanes, the number of gate pockets being equal to the number of rotor vanes, said gate having webs extending radially outward from a central hub between adjacent pockets, means for coupling said rotor to said gate to synchronize the passage of rotor vanes through gate pockets without the vanes contacting the gate webs, said coupling means providing a drive train for gate rotation from the rotor, said rotor vanes having an inner radius dimensioned to provide an orifice between the vane inner radius surface and said gate hub, said orifice being sized so as to provide a driving torque to the gate due to the passage of the vanes through the gate pockets, the gate driving torque being balanced to match gate retarding torques due to friction of said drive train and friction of said gate bearings.

4,487,065

STORAGE TANK LEVEL MONITORING APPARATUS AND METHOD THEREFOR

John A. Carlin, Aspen; William G. Mesch; Randall D. Thompson, both of Denver; Steven A. Beard, Aurora, and Tracy R. Stephens, Elbert, all of Colo., assignors to Cypher Systems, Englewood, Colo.

Filed Mar. 7, 1983, Ser. No. 473,144
Int. Cl.[3] G01F *23/28*; G01S *15/00*
U.S. Cl. 73—290 V 10 Claims



1. An apparatus for determining the level of fluid in a storage tank holding said fluid, said apparatus comprising:

means attached to the underside of the roof of said storage tank for directing acoustic pulses in a direction substantially normal to said level of said fluid, said directing means being further capable of receiving any reflections of said acoustic pulses from said fluid level and generating an analog signal proportional to said level,

means attached to said directing means and depending downardly, substantially the height of said tank, for suspendedly providing a plurality of reference disks at predetermined fixed spacings, each of said reference disks being capable of reflecting said acoustic pulses, and

means connected to said directing means for activating said directing means to provide a first acoustic pulse, said activating means being receptive of each successive analog signal from said directing means corresponding to the successive first acoustic pulse reflection from each lower reference disk for determining a calibration value compensating for the effects of the atmospheric conditions in

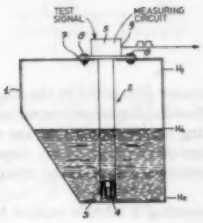
the tank above the fluid level, said activating means being capable of activating said directing means to provide a second acoustic pulse, said activating means being receptive of the reflection of said second acoustic pulse from the upper surface of said fluid and of said calibration value for determining the actual level of the fluid in said storage tank.

4,487,066

SYSTEM FOR SENSING AND SIGNALLING THE AMOUNT OF FUEL IN A VEHICLE TANK, PARTICULARLY AIRCRAFT TANK

Rodolfo Pardi, and Giorgio Marchi, both of Milan, Italy, assignors to Logic S.p.A., Italy

Filed Mar. 10, 1981, Ser. No. 242,320
Claims priority, application Italy, Jun. 13, 1980, 22746 A/80
Int. Cl.³ G01F *23/26, 27/26*
U.S. Cl. 73—304 C **10 Claims**



1. Apparatus for measuring the amount of fuel in a fuel tank, comprising:

(A) a capacitive probe disposed in a fuel tank in such a manner that the capacitance of said probe varies as a function of the level of fuel in said tank, the level of fuel in said tank being not linearly proportional to the volume of fuel in said tank whereby said capacitance varies in a manner which is not linearly proportional to the volume of fuel in the tank;

(B) an electronic circuit for generating an output signal indicative of the capacitance of said probe; said electronic circuit comprising;

(1) a trigger source for generating trigger pulses having a predetermined frequency, said trigger pulses having a constant duty cycle; and

(2) a monostable multivibrator coupled to said probe and said trigger source, said multivibrator being triggered by said trigger pulses and responding to each said trigger pulse by generating an output pulse having a duration determined by the capacitance of said probe, said output pulses defining said output signal; said multivibrator having a reset input, said multivibrator responding to the application of a pulse to its reset input by generating an output pulse having a duty cycle equal to the duty cycle of the pulse applied to its reset input;

(C) transform means including a read only memory storing information relating to the amount of fuel in said tank as determined by the shape of said tank, said transform means for converting said duration of said output pulses of said output signal which is indicative of the level of fuel in said tank to a fuel volume signal having a duration which is indicative of the volume of fuel in said tank;

(D) display means responsive to said fuel volume signal for displaying the amount of fuel in said tank; and

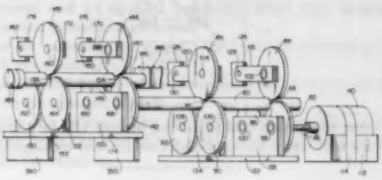
(E) means for applying said trigger pulses to said reset input of said multivibrator for testing said apparatus whereby said display means applies said trigger pulses to said reset input.

4,487,067

HIGH SPEED SPIN TEST DEVICE

Donald E. Stebbins, Dunkirk, and Mel Morganstein, Silver Spring, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 5, 1983, Ser. No. 520,797
Int. Cl.³ G01N *33/22*; F16H *13/02*
U.S. Cl. 73—432 R **11 Claims**



1. A device for supporting and rotating a shaft at very high speeds, comprising:

a. a first rotatable shaft having a circular cross section and longitudinal axis of rotation;

b. a first set of at least three circular wheels including a drive wheel;

c. the circumferential edge of each of said wheels being frictionally engaged with the circumferential edge of the shaft;

d. said wheels being distributed around the shaft so as to directly support it;

e. said drive wheel having a constant diameter larger than the diameter of the circular cross section of the shaft where the drive wheel engages the shaft;

f. means to rotatably support said wheels;

g. means to drive said drive wheel;

h. a second rotatable shaft having a circular cross section and longitudinal axis of rotation;

i. a second set of at least three circular wheels including a second drive wheel;

j. the circumferential edge of each wheel of said second set being frictionally engaged with the circumferential edge of said second shaft;

k. said second set of wheels being distributed around the second shaft so as to directly support it;

l. said second drive wheel having a diameter larger than the diameter of the circular cross section of the second shaft where it engages the second shaft;

m. means to rotatably support said second set of wheels; and

n. means to connect said second drive wheel to said first shaft.

4,487,068

METHOD AND APPARATUS FOR DETECTING ACOUSTIC EMISSIONS FROM METAL MATRIX WIRE

Gary F. Hawkins, Redondo Beach, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 9, 1983, Ser. No. 502,771
Int. Cl.³ G01N *29/04*
U.S. Cl. 73—587 **6 Claims**

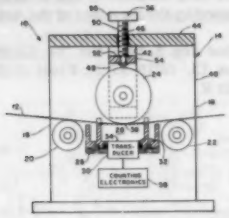
1. Apparatus for detecting acoustic emissions from a moving metal matrix wire or the like for providing on-line, real-time testing of the transverse strength of a strand of said wire as it is being manufactured, comprising:

(a) a receptacle containing a liquid bath therein;

(b) an acoustic transducer mounted to said receptacle and having a sensing surface disposed in contact with said liquid bath; and

(c) means for forming a bend in said strand of wire as the same is moving and for maintaining said moving strand of

wire at the location of its bend in contact with said liquid bath such that acoustic emissions given off by said wire



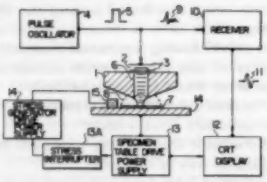
due to formation of said bend therein will be transmitted by said liquid bath and detected by said transducer.

4,487,069

METHOD OF IMAGE DISPLAY BY ULTRASONIC MICROSCOPE

Isao Ishikawa, Hino, and Hiroshi Kanda, Tokorozawa, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 2, 1983, Ser. No. 519,743
Claims priority, application Japan, Sep. 20, 1982, 57-164499
Int. Cl.³ G01N *29/04*
U.S. Cl. 73—606 **3 Claims**



1. A method of image display of a specimen by an ultrasonic wave microscope comprising an acoustic wave propagating medium, a piezoelectric member provided at one end of said medium for generating an ultrasonic beam, and an acoustic wave lens formed at an opposite end of said acoustic wave propagating medium and having a predetermined focal point, said method comprising the steps of two-dimensionally scanning a specimen disposed substantially at said focal point by said ultrasonic beam while moving one of said specimen and said beam relative to the other, and applying to said specimen repetitive stress selectively during the scanning of said specimen.

4,487,070

AUTOMATIC PRODUCTION CONTROL OF EXTENDED WORK PIECES

Erich Gerling; Karl-Heinz Schlusnus, both of Hamm, and Hans-Jürgen Wahl, Münster, all of Fed. Rep. of Germany, assignors to Hoesch Aktiengesellschaft, Dortmund, Fed. Rep. of Germany

Filed Aug. 24, 1982, Ser. No. 410,946
Claims priority, application Fed. Rep. of Germany, Sep. 1, 1981, 3134482
Int. Cl.³ G01N *29/04*
U.S. Cl. 73—609 **14 Claims**

1. Apparatus for ultrasonic inspection of regions of long extended work pieces comprising

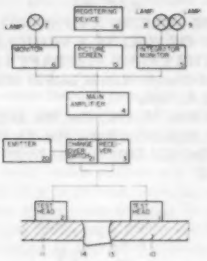
a first ultrasonic test probe disposed at a first location of a work piece;

a second ultrasonic test probe disposed at a second location of the work piece opposite to the first location relative to the region to be inspected;

an emitter for generating ultrasonic pulses; a test probe change over switch connected to each probe;

a receiver for receiving the signals from the first ultrasonic test probe and from the second ultrasonic test probe connected to the respective test probes;

an amplifier for amplifying the signals from the first ultrasonic test probe and from the second ultrasonic test probe connected to the respective test probes;



a threshold monitor connected to the amplifier;

an integrator-threshold-monitor connected to the amplifier;

output indicating units connected to the threshold monitor and integrator-threshold-monitor, respectively, for providing indications of defects in the regions to be inspected; and

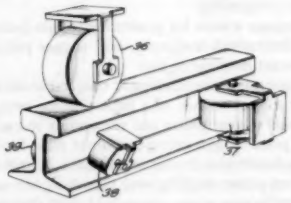
a drive for providing a relative motion between the work piece and the ultrasonic test probes.

4,487,071

FLAW DETECTION SYSTEM FOR RAILROAD RAILS AND THE LIKE

Dominick A. Pagano, Weston, and Kevin S. Morris, New Milford, both of Conn., assignors to Dapco Industries, Inc., Ridgefield, Conn.

Filed Sep. 22, 1982, Ser. No. 421,472
Int. Cl.³ G01N *29/04*
U.S. Cl. 73—612 **8 Claims**



1. Apparatus for detecting flaws in a railroad rail, the apparatus comprising;

means for transmitting ultrasonic signals into the railroad rail and for receiving associated echo signals from within the railroad rail;

distance measuring means for measuring the length of the railroad rail;

micro-processor means for dividing the railroad rail into a plurality of rail segments, said micro-processor means being responsive to operator-supplied data and to said distance measuring means for determining a length of each of said rail segments;

means for selectably applying predetermined amounts amplification to said associated echo signals received from within each of said plurality of rail segments; and

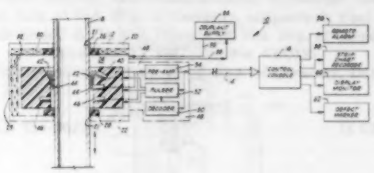
means responsive to said selectably amplified echo signals for providing indications of flaws within the railroad rail.

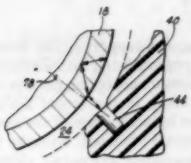
4,487,072

ULTRASONIC TESTING OF TUBULAR GOODS

Waylon A. Livingston, 770 W. Rock Creek Rd., Norman, Okla. 73069

Filed Aug. 11, 1982, Ser. No. 407,295
Int. Cl.³ G01N *29/04*
U.S. Cl. 73—622 18 Claims





12. An apparatus for ultrasonic testing of tubular goods moving axially without rotation, comprising:

a test head secured in position to have said tubular goods moved axially therethrough;

frame means supported by said test head, said frame means having a circular array means to receive said tubular goods, and having at least one fluid-tight chamber adjacent said array means;

plural ultrasonic transducer means secured within said array means and surrounding said tubular goods in equi-spaced disposition;

circuit means secured within said frame means fluid-tight chamber for controlling ultrasonic energy generation and received energy returned signal output;

fluid couplant supply means continually supplying fluid couplant to said test head to provide envelopment of said transducer means, frame means, and proximate portion of tubular goods;

control means disposed remotely from said frame means; and

multiconductor means connecting said frame means and control means.

4,487,073

ULTRASONIC SYSTEM

Yoichi Sumino, Ootawara, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jan. 25, 1983, Ser. No. 460,941
Claims priority, application Japan, Mar. 15, 1982, 57-41523
Int. Cl.³ G01N *29/00*
U.S. Cl. 73—626 2 Claims

1. An ultrasonic system for ultrasonic imaging, comprising:

an array defining an axis and including a plurality of flat annular transducer elements arranged contiguously in concentric relation and in a common plane for transmitting ultrasonic sound waves to an object in a medium and for receiving ultrasonic sound waves reflected therefrom, each of said transducer elements having substantially the same area;

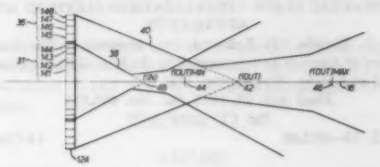
pulse generating means for applying high frequency electrical pulses to said transducer elements of said array;

control means for successively energizing said transducer elements so as to create a focus of focal maximum intensity having a predetermined ultrasonic sound beam profile at a predetermined point in a predetermined region of said medium, comprising means for varying a relative time delay between the pulses applied to said transducer elements to minimize error of delay time of ultrasonic energy transmission and reception in each individual transducer element and to equalize errors in delay time between adjacent transducer elements;

means for summing the plurality of received ultrasonic signals from said array; and

means for displaying ultrasonic image in correspondence with the summed signals;

wherein the radius of the i-th transducer element as measured from the axis of the array is given in accordance with the relation:



$$r_i=(i/N)^{\frac{1}{2}}r_N$$

wherein N is the number of coaxial annular transducer elements and r_N is the outer radius of the outermost annular transducer element; and

wherein the relative time delay T of energization of the i-th annular transducer element is determined by the means for varying a relative time delay according to the following relationships:

$$T_i=f/c[\{1+(r_N/f)^2\}^{\frac{1}{2}}-\{1+(x_i/f)^2\}^{\frac{1}{2}}]$$

$$x_i=\{(i-\tfrac{1}{2})1/N\}^{\frac{1}{2}}r_N$$

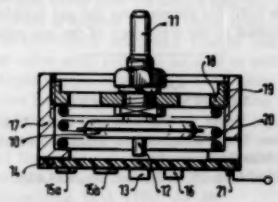
where f is the focal length along the axis of the array, and c is the velocity of the ultrasonic sound wave.

4,487,074

PRESSURE SENSOR WITH A HALL ELEMENT CIRCUIT

Werner Herden, Gerlingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Feb. 22, 1983, Ser. No. 468,396
Claims priority, application Fed. Rep. of Germany, Mar. 8, 1982, 3208243; Jul. 23, 1982, 3227516
Int. Cl.³ G01L *9/00*; H01L *10/10*
U.S. Cl. 73—708 3 Claims



1. Pressure sensor having a casing (17, 17*a*, 32) containing a membrane chamber (10, 10*a*, 33) comprising at least one resilient membrane providing shape-restoring force against which

pressure produces deformation of said membrane, said membrane being disposed substantially symmertrically about an axis which is also the axis of said casing, one resilient membrane of said membrane chamber carrying a permanent magnet (12,35), said sensor further comprising

a substrate plate (14, 14a, 34) constituting one wall of said casing which is spaced from and opposite the membrane of said membrane chamber which carries said permanent magnet;

a GaAs Hall element (13, 36) mounted on said substrate plate for providing a response to the magnetic field of said magnet dependent upon the position of said magnet, and

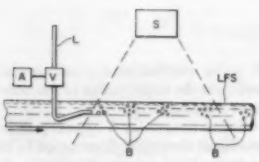
a hybrid-type circuit including thick film resistors (15a, 15b; 38) having different temperature coefficients and also a differential amplifier (16, 36), all carried on said substrate plate and connected for providing a temperature compensated response signal of Hall element.

4,487,075

HYDRAULIC FLOW VISUALIZATION METHOD AND APPARATUS

Peter G. Karidis, Mt. Lebanon, Pa., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 15, 1983, Ser. No. 485,153
Int. Cl.³ G01F 1/70
U.S. Cl. 73—861.05 **14 Claims**



1. A method for visualizing liquid flow through an enclosed passageway, comprising the following steps:

introducing pulses of gas bubbles into a flow stream of the liquid, the pulses being at a predetermined frequency,

and shining a strobe light onto the flow stream in the vicinity where the pulses of gas bubbles have been introduced, the operating frequency of the strobe light being related to the frequency of the pulses of gas bubbles.

5. An apparatus for visualizing conditions of a liquid flow stream through an enclosed passageway, comprising:

a probe body adapted to penetrate in a fluid tight manner the boundary of the passageway, said probe body including a gas passage from outside of the boundary, through the probe body to an outlet located in the passageway, a valve means for controlling gas flow, and a valve actuator means for opening and closing said valve means at a predetermined frequency to introduce pulses of gas into the liquid flow stream at said predetermined frequency,

and a strobe light for illuminating the gas bubbles at a frequency related to the frequency of the gas pulses.

4,487,076

VORTEX FLOW METER

Brian J. Burlage; David E. Wiklund, and Gary A. Lenz, all of Marshalltown, Iowa, assignors to Fisher Controls International, Inc., Marshalltown, Iowa

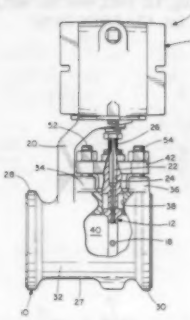
Filed Oct. 25, 1982, Ser. No. 436,426
Int. Cl.³ G01F 1/32
U.S. Cl. 73—861.24 **8 Claims**

1. An improved flow meter comprising:

a housing defining a fluid flow passage and a sensor body opening which opens into the fluid flow passage; and

flow sensor means for sensing fluid flow in the flow passage and providing a signal in relation to the fluid flow, the flow sensor means being in the fluid flow passage; and

a sensor body having a mounting portion, a strain relief portion and a flow sensor supporting portion, the mounting portion being mounted to the housing external to the housing and the sensor supporting portion being in the



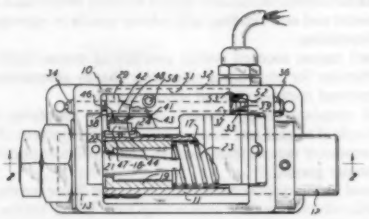
fluid flow passage and supporting the flow sensor means, the strain relief portion being intermediate the mounting portion and the sensor supporting portion, the strain relief portion further being in the sensor body opening and adapted to relieve induced strain of the sensor supporting portion from external vibration, whereby the flow meter is substantially insensitive to external vibration.

4,487,077

ELECTRIC REMOTE READOUT FOR FLUID FLOW METER

Jack E. Lake, Racine, Wis., assignor to Racine Federated Inc., Racine, Wis.

Filed May 16, 1983, Ser. No. 494,792
Int. Cl.³ G01F 1/24
U.S. Cl. 73—861.58 **9 Claims**



1. A fluid flow meter with an electric remote readout, comprising a body, a non-magnetic member supported in said body and defining a space therewith and having a fluid-flow passage therethrough, a magnetic member movably disposed in said passage for movement in accordance with fluid flow in said passage, a spring operative on said magnetic member for yieldingly urging said magnetic member in one direction in said passage, a support on said body and disposed in said space and having an elongated recess faced toward said non-magnetic member, a cylindrical magnetic follower mounted on the exterior of said non-magnetic member and rotational thereon and for movement along with the movement of said magnetic member, an electric conductor and an electric resistor mounted on said support in said recess and adjacent said non-magnetic member and extending parallel thereto, a block on said follower and extending into said recess and slidably guided therealong without rotation, electric contacts mounted on said block for movement therewith and extending into respective

sliding contact with said conductor and said resistor, an electric meter, and an electric connection extending between said conductor and said resistor and said meter for indicating the position of said contacts along said conductor and said resistor and thereby indicate the quantity of fluid flowing in said passage.

4,487,078

CLAMPING-FORCE TRANSDUCER FOR ROTATING CLAMPING DEVICES

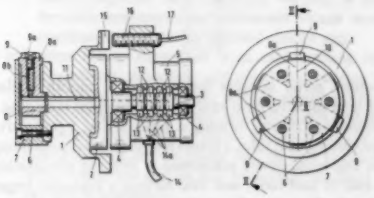
Karl-Heinz Schmitz, Meerbusch, and Josef Steinberger, Düsseldorf, both of Fed. Rep. of Germany, assignors to Paul Forkardt GmbH & Co. KG, Düsseldorf, Fed. Rep. of Germany

Filed Sep. 27, 1982, Ser. No. 425,035

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1981, 3151048

Int. Cl.³ G01L *5/16*

U.S. Cl. 73—862.06 **16 Claims**



1. In a clamping-force transducer for rotating clamping devices with clamping elements for measurement of clamping force, which transducer has at least two opposed pressure pieces adapted to be placed on the clamping elements of the corresponding clamping device and arranged in a support member, a rotating clamping-force transducer housing and a stationary transfer housing, at least one of the pressure pieces acting on a force transducer, the measurement values of which are taken from the rotating clamping-force transducer housing via the stationary transfer housing, the improvement comprising

a multi-arm measurement member,

said pressure pieces being arrangeable but fixed on the arms of said multi-arm measurement member facilitating removeable placement of a plurality of pressure pieces in a variety of symmetrically opposed positions on said arms, and

at least one said arm of said measurement member includes said force transducer.

4,487,079

DUAL RANGE FORCE TRANSDUCER

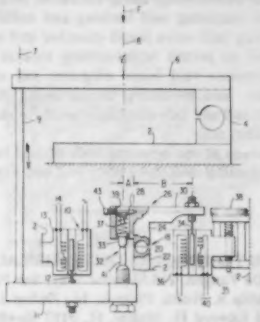
William H. Compton, Bratenahl, and Joseph M. Likozar, Highland Heights, both of Ohio, assignors to Comptrol, Incorporated, Cleveland, Ohio

Filed Feb. 22, 1983, Ser. No. 468,204

Int. Cl.³ G01L *1/04, 1/26*

U.S. Cl. 73—862.52 **6 Claims**

1. A force transducer generating dual output signals each of which bears a predetermined but different proportionality to a force, comprising, a force receiving platform cantilevered from a base through a first spring flexure to produce a displacement of said force receiving platform from a null position proportional to the magnitude of a force applied to said force receiving platform, a first control couple having relatively movable elements connected to said base and platform respectively generating a first output signal having a first proportionality to the displacement of said force receiving platform from the null position, a second control couple having relatively movable elements, one of said elements of said second control couple connected to said base, a lever connected to said platform and the other of said elements of said control couple multiplying the relative movement between said elements of said second control couple for a given displacement of said force receivng platform from the null position to thereby



generate a second output signal of different magnitude than the output signal generated by said first control couple for a given displacement of said force receiving platform from the null position.

4,487,080

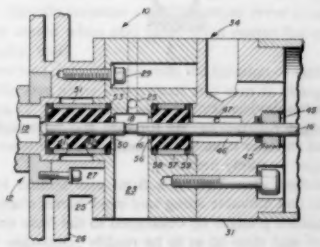
SEAL FOR LIQUID INJECTION VALVE FOR GAS CHROMATOGRAPHY

Emory J. Leaseburge, Lewisburg, and Curtis L. Perkins, Ronceverte, both of W. Va., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Jun. 8, 1983, Ser. No. 502,363

Int. Cl.³ G01N *1/20*

U.S. Cl. 73—863.83 **2 Claims**



1. In a liquid sampling valve for use with a gas chromatograph analyzer, said valve including a valve body, a chamber within said valve body for containing a liquid to be sampled, a heated vaporizing chamber adjacent said valve body, a valve stem having a sample-carrying recess therein and means for reciprocating said valve stem between a position wherein said valve stem recess is located in said valve body chamber for immersion in the liquid contained therein and a position wherein said valve stem recess is located in said vaporizing chamber, a liquid sample of specific volume being transported from said valve body chamber to said vaporizing chamber by said reciprocation,

improved valve stem sealing means for preventing leakage of liquid from said valve body chamber without loss of liquid sample volume during reciprocation of said valve stem, comprising,

a cylindrical bushing of thermoplastic material having a central bore for receiving said valve stem, said central bore being sized to provide an interference fit between said bushing and said valve stem;

a split circular collar of resilient metal, said collar having an

inside diameter smaller than the outside diameter of said bushing when fabricated, said collar encircling said bushing substantially along the entire length of said bushing and maintaining said bushing under uniform radial compression substantially along the entire length thereof;

means for mounting said bushing and collar in a position separating said valve liquid chamber and said vaporizing chamber to permit reciprocating motion of said valve stem between said liquid chamber and said vaporizing chamber, said mounting means being dimensioned to provide end and side clearance space for said bushing and said collar; and

sealing means at the opposite ends of said bushing respectively abutting said valve body and said vaporizing chamber.

4,487,081

PIPETTING TECHNIQUES USING REPLACEABLE TIPS

Donald H. De Vaughn, 119 Skyview Way, San Francisco, Calif. 94131; Philip S. Watts, Pingree, Id.; Dallas L. Raty, Provo, Utah, and Edward H. Maker, II, 3117 Bowling Green Dr., Walnut Creek, Calif. 94598, assignors to Donald H. De Vaughn and Edward H. Maker, III, both of San Francisco, Calif.

Filed Aug. 27, 1982, Ser. No. 412,384
Int. Cl.³ B01L *3/02*
U.S. Cl. 73—864.13 **56 Claims**

1. A pipetting device, comprising:

(a) an elongated barrel having forward and rearward open ends and an inner chamber extending therebetween; and

(b) a plunger assembly including

(i) a plunger stem having a front end section located within and movable along said inner barrel chamber,

(ii) a separate plunger tip connected to the front end section of said stem so as to be readily removable therefrom and connectable thereto without damage to the stem, whereby a given tip can be readily replaced with another tip, and

(iii) means for moving said stem and connected tip within said barrel in a controlled manner for collecting and dispensing a controlled amount of a given fluid

(c) Said stem being sufficiently long relative to said barrel chamber such that said tip and the front end section of said stem are movable into a position outside said chamber beyond the forward end of said barrel, whereby said tip can be removed from said stem in said outside position; and

(d) Said plunger tip including means movable between a compressed configuration when the entire tip is connected with said stem such that the entire tip can fit within said barrel chamber and a biased expanded configuration sufficiently large to prevent the tip from entering said barrel chamber, whereby movement of said tip from its stem connected position within said chamber to said outside position beyond the forward end of said barrel causes said tip means to automatically move from said contracted to expanded configuration for removal from said stem.

4,487,082

MOLTEN METAL SAMPLER FOR JOMINEY TEST

Joseph J. Boron, Medina, Ohio, assignor to Midwest Instrument Co., Inc., Hartland, Wis.

Filed Dec. 27, 1982, Ser. No. 453,010
Int. Cl.³ G01N *1/12*
U.S. Cl. 73—864.55 **3 Claims**

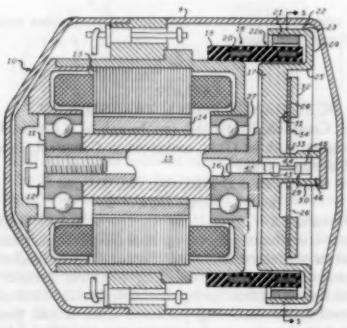
1. A molten metal sampler for forming a smooth walled sample for later metallurgical analysis, said sampler including a smooth walled metal tube forming a mold cavity, a protective sleeve surrounding said tube, a transverse circular disc defining one end of said mold cavity positioned in abutting relationship with one end of said tube, said disc having a diameter larger than the inside diameter of said tube, said tube to provide a laterally extending flange on the sample when the sample cools and having anchor means projecting within said sleeve within said mold cavity for securing said transverse disc to the sample when the sample cools, and a fill port in said protective sleeve for introducing molten metal into said metal tube.

4,487,083

PICK-OFF, TORQUER, AND REFERENCE SIGNAL GENERATOR FOR FREE ROTOR GYROSCOPES

Thomas R. Quermann, Suffolk, N.Y., assignor to Sperry Corporation, New York, N.Y.

Filed Nov. 15, 1976, Ser. No. 741,916
Int. Cl.³ G01C *19/22, 19/28, 19/30*
U.S. Cl. 74—5.46 **8 Claims**



1. In gyroscopic apparatus:

housing means,

drive shaft means journalled in said housing means,

rotor means adapted for spinning about a spin axis of said drive shaft means,

flexure means supporting said rotor means for tilting about first and second tilt axes perpendicular to said spin axis,

annular channel means at the periphery of said rotor means having a continuous uniform interior cylindrical region therein open at one end thereof and closed at the opposite end thereof,

said interior cylindrical continuous uniform region being disposed between continuous uniform first and second cylindrical interior surfaces of said annular channel means coaxial with said spin axis,

cylindrical permanent magnet means having inner and outer cylindrical magnetic surfaces,

said outer cylindrical magnetic surface being affixed to said continuous uniform first cylindrical interior surface for forming a continuous uniform cylindrical magnetic circuit gap between said inner cylindrical magnetic surface and said continuous uniform second cylindrical interior surface,

said cylindrical permanent magnet means having substantially unity permeability and cooperating with said annular channel means for providing a unidirectional radial magnetic field regularly varying in magnitude between maximum and minimum values around said continuous uniform cylindrical circuit gap,

induction means supported from said housing means for cooperatively detecting said regularly varying unidirectional radial magnetic field and for exerting torques upon said rotor means about said respective first and second tilt axes when energized by direct torquing current whereby modulation of the magnetic flux in said continuous uniform cylindrical circuit gap produced by direct torquing current is negligible.

4,487,084

PUSH-BUTTON TYPE TUNER

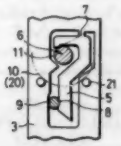
Hiroyasu Miyata, Furukawa; Keizo Watanabe, and Akio Yamaguchi, both of Iwaki, all of Japan, assignors to Sanshin Electric Co., Ltd., Japan

Filed Feb. 11, 1982, Ser. No. 347,978

Claims priority, application Japan, Feb. 13, 1981, 56-18199[U]

Int. Cl.³ F16H *35/18*

U.S. Cl. 74—10.33 **7 Claims**



1. A push-button tuner having a slide member movable longitudinally during tuning of said tuner; a locking member movable perpendicularly to the longitudinal movement of said slide member; said locking member carrying a pivotal cam member having a shaft portion fitting within a groove of said locking member, a cam portion adapted to ride along in inclined portion formed in a side edge of said slide member and a main body portion concentric with said shaft portion but having a larger diameter; and means for holding said cam member in a pivotal position placing said cam portion in a home position on said slide member when said slide member is in a position corresponding to a desired tuning condition of said tuner; said holding means including a receiving portion carried by said locking member and adapted to engage the main body portion of said cam member and a pressing member carried by said locking member and movable into engagement with said shaft portion for urging the main body portion of said cam member against said receiving portion.

4,487,085

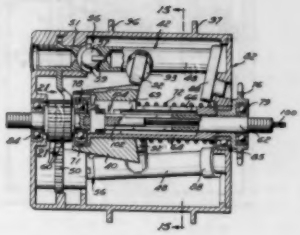
INFINITELY VARIABLE GEAR RATIO TRANSMISSION

Clifford H. Collins, 701 Monroe Way, Placentia, Calif. 92760

Filed Dec. 29, 1980, Ser. No. 220,421

Int. Cl.³ F16H *29/04*

U.S. Cl. 74—113 **52 Claims**



1. A mechanical transmission, comprising:

a cam having at lest one lobe, said lobe tapered in the direction of the axis of said cam to provide a cam lift which changes along the axis of said cam;

plural cam followers, each mounted on a shaft which straddles said cam, said shaft mounted on a pair of bearings at opposite ends of said cam, said bearings providing a rotational axis for said followers, said followers each including a follower arm contacting said cam;

input drive means for relatively rotating said cam and said rotational axes of each follower;

said rotational axis intercepting the rotational path of said cam lobe;

means for combining the oscillation of said plural followers to provide an output drive;

said cam and said followers formed and relatively positioned to provide constant velocity output drive at said combining means when said input drive means has constant velocity; and

means for relatively adjusting the location of said plural cam followers along said axis of said cam to change the location of contact between said follower arms and said cam and thereby adjust the gear ratio of said transmission.

4,487,086

INFINITELY VARIABLE TRANSMISSION

Horst Broziat, Vorwerker Strasse 62a, D-2400 Lübeck, Fed. Rep. of Germany

Filed Mar. 4, 1981, Ser. No. 240,505

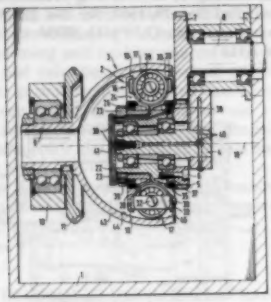
Claims priority, application European Pat. Off., Mar. 7, 1980, 80 101 167.7

Int. Cl.³ F16H *15/26, 15/00, 13/00*

U.S. Cl. 74—198 **8 Claims**

1. An infinitely variable transmission, comprising a first transmission member having a transverse-roller rotatable carrier provided with freely rotatable transverse rollers which are arranged in a circle and which are non-rotatable in the direction of their engaging movement, the axis of rotation of said carrier passing through the center of said circle in an angle perpendicular to the plane of said circle, and a second transmission member having a spherically curved working face frictionally engaged by said transverse roller, means for connecting said first transmission member to an output shaft, and adjusting means for adjusting the positions of said first and second transmission members with respect to each other to obtain a desired speed of said output shaft, the improvement

wherein the axial position of the transverse rollers on the transverse-roller carrier can be varied radially at random by a force exerted by control means located exteriorly of said transmission.



4,487,087

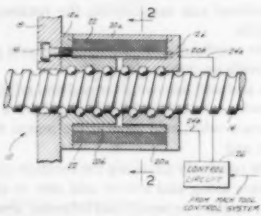
BALL NUT HAVING ADUSTABLE PRELOADING

Richard Johnstone, Brookfield, Wis., assignor to Kearney & Trecker Corporation, Milwaukee, Wis.

Continuation of Ser. No. 331,980, Dec. 18, 1981,. This application May 21, 1984, Ser. No. 611,936

Int. Cl.³ F16H *1/18, 1/20, 55/18*

U.S. Cl. 74—424.8 A **7 Claims**



1. An improved ball nut having adjustable preloading and adapted for threaded engagement with a ball screw for moving a movable member of a machine, said ball nut comprising:

a first ball nut half in threaded engagement with a ball screw;

a second ball nut half in threaded engagement with said ball screw adjacent to said first ball nut half;

means attaching said second ball nut half to the movable member;

biasing means urging said ball nut halves in opposite directions to vary ball nut preloading; and

adjusting means responsive to the rate of relative rotation between said ball nut and said screw and coupled to said biasing means for infinitely varying the force exerted by said biasing means so that said force is automatically reduced as the rate of rotation increases.

4,487,088

SPROCKET CONSTRUCTION FOR A ZERO CATERNARY CHAIN

George E. Olson, Arlington Heights, Ill., assignor to A. O. Smith Harvestore Products, Inc., Arlington Heights, Ill.

Filed Mar. 29, 1982, Ser. No. 362,920

Int. Cl.³ F16H *55/17, 55/30, 55/06, 55/08*

U.S. Cl. 74—462 **2 Claims**

1. A chain sprocket drive construction, comprising a sprocket having a plurality of teeth with the bases of adjacent teeth being connected by roots, and a chain engaged with the sprocket and including a plurality of bushings pivotally interconnected by links, said chain having substantially zero catenary and said bushings disposed to directly engage the roots as the sprocket is rotated, the pitch line clearance of said sprocket being enlarged and having the formula of:

$$\Delta C_p = 2\mathrm{Sin}\left(\frac{180}{n}\right)(D_o - D_m) + A_t$$

where ΔC_p is the enlargement in pitch line clearance, A_t is the accumulated total tolerance of chain links engaged with sprocket teeth, n is the number of teeth in the sprocket, D_o is the operating pitch diameter, and D_m is the calculated pitch diameter, the operating pitch diameter having the formula of:

$$D_o = \frac{P + \Delta P}{\mathrm{Sin}\left(\frac{180}{n}\right)}$$

where P is the pitch and ΔP is the increase in pitch, the pitch diameter D_m having the formula of:

$$D_m = \frac{P}{\mathrm{Sin}\left(\frac{180}{n}\right)}$$

4,487,089

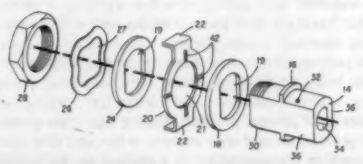
MINIATURE ADJUSTABLE POTENTIOMETER CLUTCH

Craig E. Harwood, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Dec. 18, 1981, Ser. No. 332,139

Int. Cl.³ G05G *5/06*

U.S. Cl. 74—531 **21 Claims**



1. An apparatus for controlling the torque required to move a rotatable member comprising:

means for forming a body element having an axial opening therethrough extending along an axis, said body element being rotatable about said axis;

at least one first friction means coupled to said body element for rotational movement therewith and having a first friction surface;

second friction means coupled about the body element for providing at least one second friction surface positioned adjacent said first friction surface, said second friction means including means for engaging a fixed member to maintain said second friction means stationary so that there is relative rotational movement between said first friction surface and said second friction surface during rotation of said body element; and

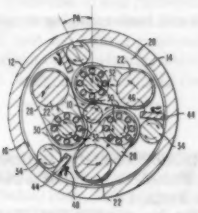
means coupled to said body element for adjustably positioning said first friction surface and said at least one second friction surface in forceful frictional contact to adjustably vary the torque needed to rotate said body element.

4,487,090

FRICTION DRIVE TRANSMISSION

Walter J. Burnham, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 30, 1982, Ser. No. 412,760
Int. Cl.³ F16H *13/08*
U.S. Cl. 74—798 **11 Claims**



1. A friction drive transmission comprising:

a case having a cylindrical inner surface;

a first rotatable shaft extending into one side of said case forming an annular path between said cylindrical surface and said first shaft;

a second rotatable shaft axially aligned with said first shaft and extending into a second side of said case;

a plurality of pinions extending from said second shaft into said annular path, said pinions having axes in parallel with the axes of said first and second shafts;

a plurality of drive rollers having axes in parallel with the axis of said first and second shafts, said drive rollers being disposed within said annular path, wherein the surface of each drive roller makes frictional contact with the surface of said first rotatable shaft;

a plurality of links, each of said links being pivotally connected to one of said pinions and to one of said drive rollers;

a plurality of pinch rollers having axes in parallel with the axis of said first and second shafts, said pinch rollers being disposed within said annular path; and

means for urging each of said pinch rollers into frictional contact with said cylindrical inner surface and into frictional contact with one of said drive rollers.

4,487,091

SPEED REDUCER AND METHOD FOR REDUCING BLACKLASH

Michel A. Pierrat, 48 Farrwood Dr., Andover, Mass. 01810

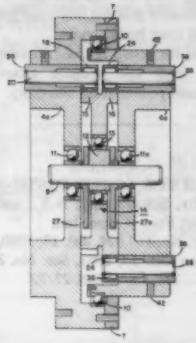
Filed Feb. 1, 1982, Ser. No. 344,886
Int. Cl.³ F16H *1/28, 13/10, 55/18*
U.S. Cl. 74—805 **16 Claims**

11. In a speed reduction mechanism having a plurality of spaced rollers in simultaneous engagement with a rotor having a perimeter defined by a smooth curve forming a plurality of equally-spaced lobes,

apparatus for substantially eliminating backlash comprising

a plurality of shafts each supporting one of said rollers,

means rigidly supporting each of said shafts at a point removed from the said roller carried thereby,



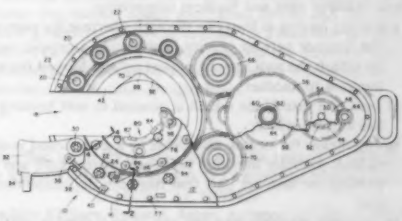
and stop means supported independently of any deflection of said shafts spaced from each of said shafts adjacent the roller carried thereby and arranged to limit the deflection of said shaft and maintain it within its elastic limit.

4,487,092

POWER TONG METHODS AND APPARATUS

Billy W. Neves, Odessa, Tex., assignor to Eckel Manufacturing Company, Inc., Odessa, Tex.

Filed Dec. 10, 1982, Ser. No. 448,710
Int. Cl.³ B25B *17/00*
U.S. Cl. 81—57.18 **20 Claims**



1. An open throat power tong assembly for rotating a tubular member to make up or break apart a threaded joint, comprising:

a tong body having a first throat portion for receiving said tubular member;

a cage plate assembly rotatably mounted to said tong body and having a second throat portion for receiving said tubular member;

a plurality of gripping members carried by said cage plate assembly and movable for gripping engagement with said tubular member;

a partial ring member rotatably mounted within said tong body and having a third throat portion for receiving said tubular member and a plurality of cam surfaces for increasing the force exerted by said gripping members on said tubular member;

an arcuate groove formed on a surface of either said tong body or said partial ring member and having a variable diameter responsive to radial spreading of said power tong assembly;

power means for rotating said partial ring member relative to said tong body;

a plurality of bearing assemblies each mounted to said cage plate assembly; and

each of said bearing assemblies including

(a) guide means axially movable with respect to said cage plate assembly and in engagement with said arcuate groove for rotatably guiding said cage plate assembly with respect to said tong body; and

(b) biasing means for resisting axial movement of said guide means away from said arcuate groove during radial spreading of said power tong assembly.

4,487,093

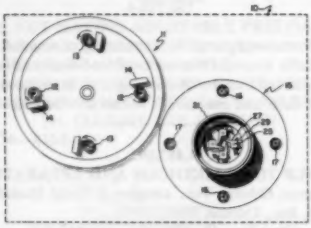
DISPENSER FOR SCREW FASTENER NUTS

Donald C. Peroutky, Schenectady, N.Y., assignor to General Electric Company, Fort Wayne, Ind.

Continuation of Ser. No. 169,024, Jul. 15, 1980, abandoned. This application Oct. 13, 1981, Ser. No. 310,678

Int. Cl.³ B25B *23/02*

U.S. Cl. 81—57.37 **13 Claims**



1. A dispenser tool for small apertured fastener parts such as screw fastener nuts and washers comprising:

a housing having at least one through-aperture for passage of the fastener part by gravity, and having a gripper section by which the tool may be picked up and moved from one location to another;

at least one gate blade which is pivoted to said housing and has a cam surface;

spring means for urging said blade to a gate closed position at least partially blocking said through-aperture and supporting the fastener part that has been deposited therein; and

an actuator movable into and out of engagement with said cam surface to pivot said blade to gate open position and unblock said through-aperture so that the fastener part falls and is dispensed.

4,487,094

TURNBUCKLE RATCHET TIGHTENING TOOL

Robert A. Wilkens, 202 S. 5th St., and Michael F. Robbins, 406 N. 3rd St., both of Oquawka, Ill. 61469

Filed Feb. 4, 1983, Ser. No. 463,748

Int. Cl.³ B25B *13/46*

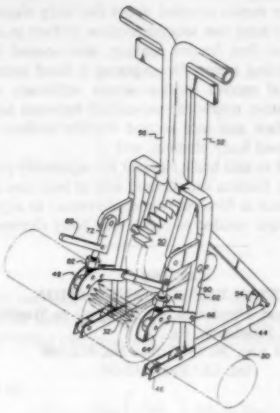
U.S. Cl. 81—57.39 **9 Claims**

1. In combination with a turnbuckle having a carrier body with ratchet teeth about its periphery, a tool having a base frame,

a ratchet teeth engaging actuator rotatably mounted on said frame with teeth thereon engageable with said ratchet teeth on said carrier body,

retaining means on said frame to rotatably retain said carrier body thereon,

a foot operated actuator pivotally mounted on said frame, and ratchet means interconnecting said foot operated



actuator with said teeth engaging actuator to cause rotation thereof.

4,487,095

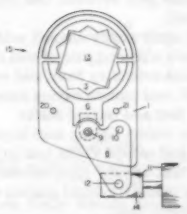
SQUEEZE TORQUE WRENCH

Bobby W. Collins, Kenner, La., assignor to Power Tork Hydraulics, Inc., Baton Rouge, La.

Continuation of Ser. No. 452,320, Dec. 27, 1982, abandoned, which is a continuation of Ser. No. 232,717, Feb. 9, 1981, abandoned. This application Nov. 21, 1983, Ser. No. 554,053

Int. Cl.³ B25B *13/46*

U.S. Cl. 81—57.39 **5 Claims**



1. A gearless squeeze torque wrench for use with power means comprising:

(a) a hollow wrench case with a nut insert opening traversing the depth of the case and bordered on one end by a fixed gripping jaw fixed to said case;

(b) a floating gripping jaw having multiple teeth which slides in said wrench case having its jaw forming the opposite border of the nut insert opening from the fixed gripping jaw; and

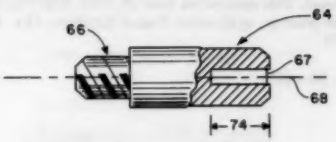
(c) a power transfer means pivotally attached inside said wrench case at a first pivot point, said power transfer means being pivotally attached to said floating gripping jaw at a second pivot point and further pivotally attached to said power means at a third pivot point, wherein the alignment of said first pivot point and said third pivot point is generally perpendicular to the alignment of said first pivot point and said second pivot point.

4,487,096

SCREW TYPE BLIND RIVET DRIVER ADAPTER

Thomas B. Randall, 2628 N. 1375 W., Clinton, Utah 84015

Filed Feb. 23, 1983, Ser. No. 469,177
Int. Cl.³ B25B *13/06*
U.S. Cl. 81—121 A 3 Claims



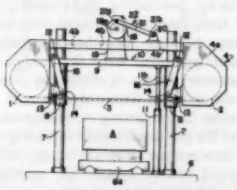
1. An adapter for a power drill for setting screw type blind rivets, said rivets comprising a threaded mandrel having a driving end portion with parallel driving flats machined down to at least the minor diameter of the threads of said mandrel, which adapter consists essentially of a cylindrical body having an axis, said body further having a threaded end portion and an opposite end having a laterally elongated slot therein, said slot having a major and minor diameter with the major diameter of the slot extending transverse to said cylindrical body axis, and forming a shape complementary to said driving end portion of said rivet mandrel, said slot having positioned symmetrically about the rotational axis of said adapter, said slot being adapted to receive the said flatted mandrel of said rivet therein.

4,487,097

METHOD AND MACHINE FOR CUTTING BY AUTOMATIC BAND SAW

Toshio Hara, and Nobuo Hara, both of Hyogo, Japan, assignors to Hiromichi Hara, Tottori, Japan

Filed Sep. 30, 1982, Ser. No. 430,533
Claims priority, application Japan, Sep. 16, 1982, 57-161786
Int. Cl.³ B23D *53/04, 55/08*
U.S. Cl. 83—56 15 Claims



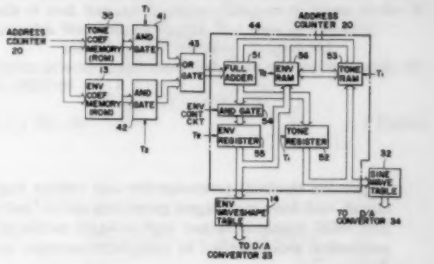
1. A method for cutting a workpiece by automatic hand saw, said band saw being an endless belt between a pair of pulleys, the method comprising the steps of: (a) securing the workpiece beneath the band saw, (b) causing the band saw to descend to proximate the workpiece, and (c) cutting the workpiece, said workpiece being cut by: (i) progressively tilting said band saw to cut an arc-shaped track in the workpiece, (ii) causing said band saw to descend a feed amount when the band saw is proximate the periphery of the workpiece, the angle of the band saw relative to horizontal then being at a maximum, and (iii) iteratively causing one or more additional arc-shaped tracks in the workpiece by oscillating the band saw in such progressively tilting motions, said band saw descending said feed amount each time the band saw is proximate the periphery of the workpiece, the angle of the band saw relative to horizontal then being at a maximum.

4,487,098

RHYTHM GENERATOR

Toshio Mishima, Kitamoto, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho and Tokyo Shibaura Denki K.K., both of, Japan

Continuation of Ser. No. 292,911, Aug. 14, 1981, abandoned.
This application Aug. 12, 1983, Ser. No. 510,231
Claims priority, application Japan, Aug. 30, 1980, 55-119929; Aug. 30, 1980, 55-119930
Int. Cl.³ G10H *1/057, 1/40*
U.S. Cl. 84—1.03 2 Claims



1. A rhythm generator comprising:

a musical sound generating circuit for reading out a musical sound from a musical waveshape memory using address information obtained by accumulating frequency information stored in a tone coefficient memory;

an envelope generating circuit for reading out from an envelope memory an envelope waveshape corresponding to each tone by accumulating envelope information determining an envelope time corresponding to each tone using address information obtained by accumulating the envelope information stored in an envelope coefficient memory; and

an address counter for performing address assignment to cause the musical sound generating circuit and the envelope generating circuit to operate on a time-divided basis;

wherein the frequency information and the envelope information are respectively accumulated by a common accumulator on the time-divided basis.

4,487,099

ELECTRO-ACOUSTIC TRANSDUCER DRIVE CIRCUIT FOR PRODUCING DAMPED WAVEFORM ENVELOPE MUSICAL NOTES

Heihachiro Ebihara, Tanashi, Japan, assignor to Citizen Watch Company Limited, Tokyo, Japan

Filed Jul. 28, 1983, Ser. No. 518,234
Claims priority, application Japan, Jul. 30, 1982, 57-133203; Jul. 30, 1982, 57-133205
Int. Cl.³ G10H *1/02*
U.S. Cl. 84—1.26 15 Claims

1. An electro-acoustic transducer drive circuit powered by a DC power source producing at least first and second power supply potentials, for driving an electro-acoustic transducer to emit audible musical notes having a damped waveform envelope, comprising:

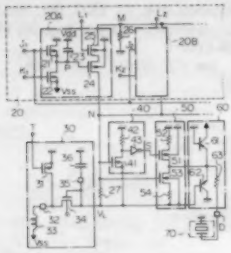
a voltage step-up circuit for producing a stepped-up DC potential with respect to said first power supply potential, with the potential difference between said stepped-up potential and said first power supply potential being greater than the potential difference between said first and second power supply potentials;

a drive input signal generating circuit for producing drive input signals;

a first MOS transistor for producing a drive signal to drive said electro-acoustic transducer, having the source electrode and substrate thereof connected to receive the

stepped-up potential from said voltage step-up circuit and having the gate electrode coupled to receive said drive signal, and;

a protective circuit coupled between the drain electrode of first MOS transistor and the electro-acoustic transducer,



to provide electrical protection for said voltage step-up circuit, said drive input signal generating circuit, and said first MOS transistor against high voltages produced by mechanical shock applied to said electro-acoustic transducer.

4,487,100

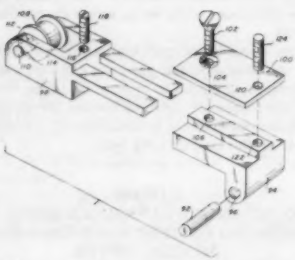
ADJUSTABLE MUSICAL BRIDGE ASSEMBLY

David C. Storey, 737 Pine St. #33, San Francisco, Calif. 94108

Continuation of Ser. No. 413,490, Aug. 31, 1982, , which is a continuation-in-part of Ser. No. 260,977, May 6, 1981, abandoned. This application Apr. 2, 1984, Ser. No. 597,655

Int. Cl.³ G10D *3/04*

U.S. Cl. 84—299 **7 Claims**



1. An adjustable bridge for supporting the strings of a musical instrument, comprising

(a) mounting bar means connected with the musical instrument and having a longitudinal axis; and

(b) a plurality of bridge elements connected with said mounting bar means for supporting the instrument strings, respectively, each of said bridge elements comprising

(1) journal block means adjustably mounted on said mounting bar means for pivotal and longitudinal movement relative thereto;

(2) means for rigidly fixing said journal block means in an adjusted position on said mounting bar means;

(3) string support means adjustably connected with said journal block means, respectively, for movement normal to said mounting bar axis, whereby said string support means are adjustable longitudinally of the instrument strings, respectively; and

(4) means for rigidly fixing said string support means in an adjusted position relative to said journal block means, respectively.

4,487,101

DIGITAL SOLID STATE RECORDING OF SIGNALS CHARACTERIZING THE PLAYING OF A MUSICAL INSTRUMENT

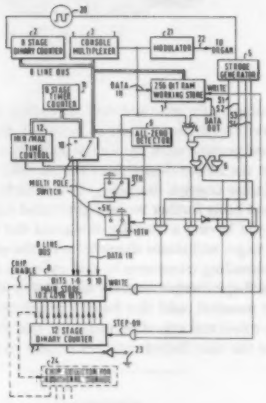
Leonard W. Ellen, Briarmead, Chiltern Rd., Ballinger, Gt. Missenden, Buckinghamshire, England

Continuation-in-part of Ser. No. 85,120, Oct. 15, 1979, abandoned. This application Feb. 25, 1982, Ser. No. 352,144

Claims priority, application United Kingdom, Oct. 18, 1978, 40970/78

Int. Cl.³ G10G *3/04*

U.S. Cl. 84—462 **7 Claims**



1. A recording and playback system for a keyboard musical instrument, comprising:

means for providing successive outputs indicative of the state of operation of keys of a keyboard instrument whilst being played, comparison means responsive to said successive outputs for providing digital change of state signals indicative of an occurence of a change of state of key operation and defining an address representative of which of the keys has changed its state,

timing means for developing digital timing signals representative of time intervals between successive changes of state of key operation, said timing signals being coded so as to be distinguishable from the change of state signals,

solid state memory means operative to store said change of state signals and said timing signals, and

playback means for retrieving stored signals from the memory means, the playback means including means for distinguishing between the retrieved change of state signals and the retrieved timing signals for enabling playback by means of the keyboard instrument.

4,487,102

STOWAGE PACK FOR CONTROLLED BOMB/MINE LANYARD PAYOUT

Alfred G. Fritz, Baltimore, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 1, 1983, Ser. No. 510,040

Int. Cl.³ F41F *5/02*; B64D *1/04*

U.S. Cl. 89—1.55 **6 Claims**

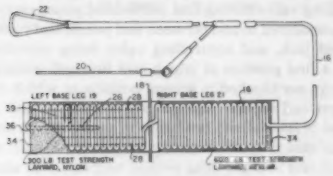
1. A stowage pack adapted for operative attachment to an aircraft shackle and stow therein a lanyard, one end of which is connected with a store to pay out with the store upon its release from the aircraft shackle, comprising:

a length of flat fabric webbing adapted to be secured to an aircraft shackle;

said webbing including a pair of depending base legs having inner faces;

a lanyard having one end fixedly secured to one base leg end and S-folded up the inner face of that leg and down the inner face of the other leg and extending therefrom for operative connection with a store;

a portion of the lanyard adjacent its one fixed end having a lower tensile strength than the remainder of the lanyard for defining a weak link;



said base legs stitched together in facing relationship to secure the S-folded lanyard therebetween;

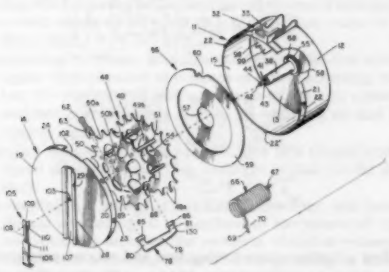
whereby, upon the store falling away, the lanyard attached to it is pulled from between the base legs by progressively breaking stitching, and, when the lanyard is fully paid out, it breaks at the weak link under the weight of the store.

4,487,103

DRUM MAGAZINE

Maxwell G. Atchisson, 6695 Ridgemoore Dr., Doraville, Ga. 30360

Filed Jun. 24, 1982, Ser. No. 391,665
Int. Cl.³ F41C *25/10*; F41D *10/12*
U.S. Cl. 89—33.02 **18 Claims**



1. A drum magazine for storing and feeding rounds of ammunition to a firearm, comprising:

a body;

a rotor within said body and biased for rotation;

a plurality of discrete round-receiving recesses defined about the periphery of said rotor to engage and carry a corresponding plurality of rounds along a path within said body;

extension means extending from said body for placement in round feeding relation with a firearm, said extension means having a round-feeding opening and means providing a round feeding path between the extension means and said rotor so that the biased rotation of the rotor serially moves each round-receiving recess to the extension means;

follower means carried by said rotor behind the last round-receiving recess to arrive at the extension means, said follower means operatively assuming a radially extended first position to engage the last round and displace that round outwardly from the rotor recess toward said round-feeding opening when the last round-receiving recess is in round feeding relation to the extension means; and

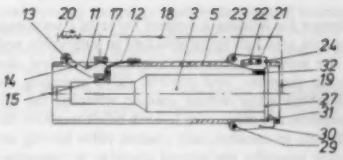
said follower means being movable inwardly to a second position to allow the rotor to be moved past the fully loaded position, thereby providing sufficient room to enable a closed first round of the fully-loaded drum magazine to be displaced in said extension means by the presence of a closed bolt in the firearm when the magazine is placed on the firearm.

4,487,104

CONTAINER FOR THE PICKUP AND FEED OF A CARTRIDGE

August Schiele, Augsburg, and Helmut Janda, Schwabmünchen, both of Fed. Rep. of Germany, assignors to Firma Keller & Knappich Wehrtechnik GmbH, Fed. Rep. of Germany

Filed Aug. 19, 1981, Ser. No. 295,602
Claims priority, application Fed. Rep. of Germany, Aug. 19, 1980, 3031203
Int. Cl.³ F41F *9/06*
U.S. Cl. 89—34 **6 Claims**



1. In a magazine for the gun of an armored vehicle, having an endless track with a plurality of cartridge containers each for containing a cartridge having a bottom flange, the improvement wherein each of the containers comprises:

a jacket having opposite open ends for receiving and discharging a cartridge, at least two first perforations and at least two second perforations intermediate said opposite ends;

a pincer pivotally mounted to said jacket adjacent each of said at least two first perforations and movable into each of said at least two first perforations for frictionally engaging a cartridge in said jacket, each pincer having a cam surface;

a pawl pivotally mounted to sid jacket adjacent each of said at least two second perforations and movable into each of said at least two second perforations for engaging a cartridge in said jacket, each pawl having a limit stop shaped to engage at least a top surface of a cartridge bottom flange in said jacket for positively holding a cartridge in said jacket from exiting said jacket through one of said opposite openings;

a sliding sleeve slidable over said jacket adjacent said at least two first perforations for engaging said cam surface of each pincer to move each pincer into engagement with a cartridge in said jacket;

a plurality of rods connected to said sliding sleeve and slidably mounted with respect to said jacket;

said magazine including at least two pins movably mounted with respect to said jacket when said jacket is in alignment with the gun of the armored vehicle, for engaging said rods to move said sliding sleeve;

drive means connected to said magazine for moving said at least two pins;

each pawl operatively connected to said rods and sliding sleeve for moving into and out of engagement with a cartridge in said jacket with movement of said rods and sliding sleeve; and

at least two spring catches pivotally mounted to said jacket and movable into engagement with a bottom surface of a cartridge bottom flange in said jacket to hold a cartridge from movement from the other of said open ends.

4,487,105

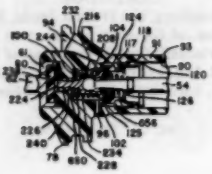
FOUR POSITION CONTROL VALVE FOR A PNEUMATICALLY OPERATED SERVOMOTOR

Gregory K. Harrison, South Bend, Ind., assignor to The Bendix Corporation, Southfield, Mich.

Continuation-in-part of Ser. No. 205,480, Nov. 10, 1980, abandoned. This application May 6, 1983, Ser. No. 492,322

Int. Cl.³ F15B *9/10*

U.S. Cl. 91—369 A **8 Claims**



1. A retainer for holding a control valve of a servomotor in a bore of a hub, said hub being attached to a movable wall that separates the interior of the servomotor into a first chamber and a second chamber, said control valve engaging said retainer to establish a full release position whereby the first and second chambers are connected to each other to allow the fluid pressure therein to equalize, said control valve having an actuation position whereby the second chamber is connected to a source of fluid under pressure to develop a pressure differential across the movable wall and produce an output force corresponding to an input force applied to the control valve characterized by said retainer cooperating with said hub to permit said control valve to move from the full release position to a fixed rest position adjacent the actuation position to reduce the valve travel required to reach the actuation position in response to the input force;

said control valve having a plunger with a first end and a second end, said first end being connected to receive a reaction force corresponding to the output force;

an input member connected to said second end of said plunger;

a poppet located in said bore and having a first end secured to said hub and a second end free to move within said bore;

a first spring for urging said plunger toward the full release and rest positions;

a second spring for urging said free end of the poppet into engagement with said second end of said plunger during the full release and rest positions and with a seat on the hub on movement of the plunger to the actuation position;

said retainer having a cylindrical body fixed to the plunger adjacent said first end, said cylindrical body having a rib on the peripheral surface thereof that engages a first shoulder on the hub to limit the movement of the plunger in establishing said full release position; and

a disc located on said plunger and urged into engagement with said cylindrical body by said first spring, said disc engaging a second shoulder on said hub on movement of the plunger to the fixed rest position to assure continued fluid communication between the first and second chambers in order that the fluid pressure therein remains equal.

4,487,106

FLUID OPERATED SYSTEM

Jesse L. Field, Jr., Mentor, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed Nov. 4, 1983, Ser. No. 548,736

Int. Cl.³ F15B *13/06*

U.S. Cl. 91—436 **18 Claims**

10. A fluid control system, comprising:

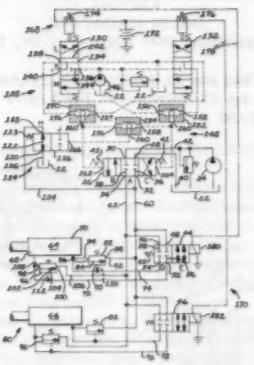
a reservoir;

a pump connected to said reservoir;

a work implement;

a first fluid operated jack having rod and head ends and being mounted on said implement, said first fluid operated jack being connected to said pump, one of the rod and head ends of said first jack being adapted to deliver a first signal in response to pressure within said one of the head ends being greater than a preselected magnitude;

a controlling valve having first and second passageways and being connected to and between said pump, said reservoir, and said jack, said controlling valve being movable between a first position at which said first and second passageways are blocked, a second position at which one of said first and second passageways is open to said pump and one of the rod and head ends of said first jack and the other of said first and second passageways is open to the other of said rod and head ends of said first jack and said reservoir, and a third position at which the other of said first and second passageways is open to said pump and the other jack end and said one of the first and second passageways is open to said one jack end and said reservoir, said controlling valve enabling flow from either jack end to be connected to reservoir through said first or second controlling valve passageway when said controlling valve is in the second or third position;



a first selecting valve having first and second passageways and being connected to and between the controlling valve and the first jack, said first selecting valve being movable between a first position at which said first selecting valve first and second passageways are blocked, and a second position at which said first seiecting valve first passageway is open to said one of the rod and head ends of said first jack and one of the control valve first and second passageways, and the first selecting valve and second passageway is open to said other of the rod and head ends of said first jack and the other of the controlling valve first and second passageways;

first means for receiving said first delivered signal and passing fluid flow from said one of the rod and head ends of said first jack, said fluid flow being passable by the first selecting valve to the other end of said first jack at the second position of the first selecting valve, and blocked from being passable to the other end of the first jack at the first position of said first selecting valve;

second means for passing fluid flow in parallel with said controlling valve from said first means to the reservoir in response to said controlling valve being at said first position, and for blocking fluid flow from passing in parallel from said first means to said reservoir in response to said controlling valve being at said second or third position.

4,487,107

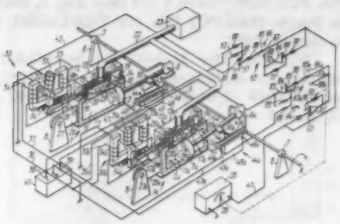
METHOD OF CONTROLLING REVOLUTION OF DRIVE SHAFT EXTERNAL COMBUSTION ENGINE AND RUSSIN EXTERNAL COMBUSTION ENGINE

Leonid P. Russin, ulitsa Nelidovskaya, 22, kv. 18, Moscow, U.S.S.R.

Continuation of Ser. No. 045,674, Jun. 5, 1979, abandoned. This application Nov. 5, 1981, Ser. No. 318,569

Int. Cl.³ F01B *25/04*; F15B *13/16*

U.S. Cl. 91—471 **3 Claims**



1. A method of controlling the revolution of the drive shaft of an engine, comprising:

shaping a first control signal for a first switching member, in the form of sinusoidal sustained first vibrations;

setting the frequency of said first vibrations to be equal to a preset r.p.m. value of the drive shaft;

shaping a second control signal for a second switching member, shifted with respect to said first control signal through a constant circuit angle equal to 90°, in the form of sustained second vibrations;

setting the frequency of said second vibrations of said second control signal to be equal to a preset r.p.m. value of the drive shaft;

converting by means of a first converter said first control signal to mechanical movement of a first actuating member, the variation of said movement of the first actuating member corresponding in time to variation of said first control signal;

varying an instantaneous value of said first shaped control signal in proportion to the variation of load on the drive shaft;

converting by means of a second converter said second shaped control signal to mechanical movement of a second actuating member, the variation of said movement of the second actuating member corresponding in time to variation of said second control signal;

varying an instantaneous value of said second shaped control signal in proportion to the variation of load on the drive shaft;

converting said mechanical movement of the first actuating member by said first converter and said mechanical movement of the second actuating member by said second converter to the drive shaft revolution at a preset r.p.m. value; and maintaining said constant circuit angle essentially equal to the angle of turn of the shaft produced by said second converter relative to the angle of turn of the shaft produced by said first converter.

4,487,108

VARIABLE DISPLACEMENT PUMP/MOTOR

Carl T. McLuen, 26930 S.E. 216th St., Maple Valley, Wash. 98038

Filed Sep. 23, 1982, Ser. No. 422,362

Int. Cl.³ F01B *13/04*; F04B *1/30*

U.S. Cl. 91—504 **11 Claims**

1. A variable displacement pump/motor comprising:

a housing including an axial cylinder block bore;

an axially elongated cylinder block mounted for rotation within said bore about a longitudinal axis, said cylinder block having a first end and a second end and including a plurality of axial cylinder bores arranged in a ring surrounding the axis of rotation of the cylinder block;

two pistons disposed in each cylinder bore, for opposed reciprocation in the bore;

a first bearing support member within said housing, spaced axially outwardly from the first end of the cylinder block, and including an inner end portion which is set at a fixed oblique angle with respect to the axis or rotation of the cylinder block;

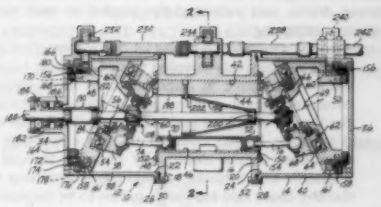
a second bearing support member within said housing, spaced axially outwardly from the second end of the cylinder block, and including an inner end portion which is set at a fixed oblique angle with respect to the axis or rotation of the cylinder block;

a first piston drive ring positioned within said housing on the first bearing support member;

first bearing means carried by the first bearing support member, mounting said first piston drive ring onto said first bearing support member, for rotation relative to the first bearing support member;

second bearing means carried by the second bearing support member, mounting said second piston drive ring onto said second bearing support member, for rotation relative to the second bearing support member;

a piston rod connected to each piston and extending generally axially outwardly from the cylinder bore in which its



piston is situated, and at its outer end being connected to the piston drive ring at its end of the housing;

third bearing means within said housing mounting the first bearing support member for rotation about the axis or rotation of the cylinder block;

fourth bearing means within said housing mounting the second bearing support member for rotation about the axis or rotation of the cylinder block;

controllable positioning means for rotating the first and second bearing support members in opposite directions and holding them fixed relative to each other in a selected position;

drive shaft means connected to both piston drive rings;

inlet port means in said housing connecting with center portions of the cylinder bores on one side of the cylinder block;

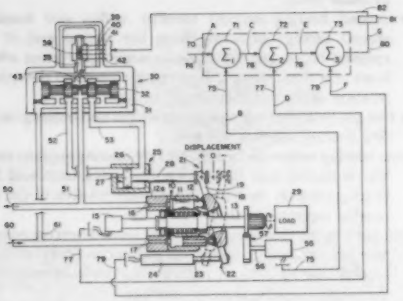
outlet port means in said housing communicating with center portions of the cylinder bores on the diametrically opposite side of the cylinder block; and

wherein the cylinder block includes an open center and wherein the drive shaft means includes a portion which extends axially through the open center of the cylinder block, a first universal joint connecting such shaft portion to the first piston drive ring, a second universal joint connecting said shaft portion to the second piston drive means, and a torque transmitting coupling interconnected between said shaft portion and the cylinder block.

4,487,109
ELECTRO-HYDRAULIC CONTROL SYSTEM FOR A POWER DRIVE UNIT

Wesley A. Burandt, and Albert L. Markunas, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Mar. 30, 1982, Ser. No. 363,701
Int. Cl.³ F01B *13/04, 25/00*
U.S. Cl. 91—506 **13 Claims**



1. An electro-hydraulic control system for a power drive unit having a wobbler controlled variable displacement hydraulic motor wherein the control system causes the displacement of the hydraulic motor to match a load to be driven by a power driven unit output shaft coupled to said motor, said system comprising:

electro-hydraulic servo means having a controlled moveable means responsively coupled to said wobbler to cause said wobbler to move in response to an input load position command signal delivered to a signal summing means electrically coupled to said electro-hydraulic servo means,

said wobbler having coupled thereto a wobbler position transducer means electrically coupled to said electro-hydraulic servo means via said signal summing means to thereby cause said moveable means to be responsive to an actual position of said wobbler,

a speed responsive means coupled to said power drive unit output shaft and electrically coupled via said signal summing means to said electro-hydraulic servo means to thereby cause said moveable means to be responsive to said power drive unit output shaft velocity,

said signal summing means including a signal summing circuit having a velocity command input signal proportional to said input load position command signal and an actual velocity command input signal delivered by said speed responsive means,

said signal summing circuit having an output signal representative of a wobbler position command, said signal summing circuit output signal providing an input to another signal summing circuit, said other signal summing circuit having another input signal representative of said actual wobbler position received from said electrically coupled wobbler position transducer means,

said other signal summing circuit having an output delivered to said electro-hydraulic servo means, said other signal summing circuit output signal having a current characteristic of a nature that causes said electro-hydraulic servo means responsively coupled to said wobbler to cause said wobbler to move and thereby change said motor displacement,

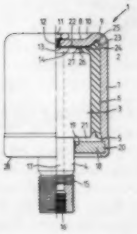
said hydraulic motor displacement thereby being caused to match said load as a combined function of said input load position command, said wobbler position and said velocity of said power drive unit output shaft, and

said control system providing a nonparasitic loss control for said power drive unit such that appearance of said load on said output shaft in the same direction as that commanded by said input load position command to said control system will cause said power drive unit wobbler controlled variable displacement hydraulic motor to operate as a pump and thereby regenerate power back into said system for additional useful work by other means.

4,487,110
CLAMPING ELEMENT

Olof Olofsson, Deje, Sweden, and Gunnar Larsson, Überlingen, Fed. Rep. of Germany, assignors to E.M.E. System Aktiebolag, Deje, Sweden

PCT No. PCT/SE82/00099, § 371 Date Dec. 6, 1982, § 102(e) Date Dec. 6, 1982, PCT Pub. No. WO82/03669, PCT Pub. Date Oct. 28, 1982
PCT Filed Mar. 31, 1982, Ser. No. 448,847
Claims priority, application Sweden, Apr. 13, 1981, 8102345
Int. Cl.³ F01B *19/04, 31/00*; B23Q *3/08*; F16C *11/10*
U.S. Cl. 92—93 **20 Claims**



11. A clamping element comprising:

a cylinder member of predetermined internal cross-sectional dimension having an axis and two ends, said cylinder member comprising at least one enclosing wall substantially parallel to said cylinder member axis and an end cap, integral with said at least one enclosing wall, substantially transverse to said cylinder member axis, closing one end of said cylinder member in a fluid-tight seal, whereby said cylinder member has one closed end and one open end;

a piston body having an axis and of predetermined outside cross-sectional dimension less than the internal cross-sectional dimension of said cylinder member, said piston body substantially coaxially receivable within said cylinder member with a gap between said piston body and said at least one enclosing wall;

a resilient member disposed within said gap and connecting said piston body to said at least one enclosing wall in a fluid-tight seal, said resilient member spring-elastically resisting axial movement of said piston body with said cylinder member;

a piston rod having an axis connected to said piston body and extending coaxially outwardly through the open end of said cylinder member;

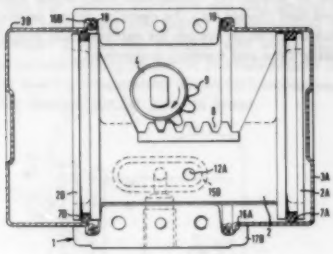
a female clamping member; external engaging means for detachably engaging said female clamping member, said external engaging means disposed on the outward end of said piston rod;

means for introducing a pressurized fluid into said cylinder member between said piston body and said end cap, whereby upon axial displacement of said piston body toward said open end of said cylinder member, said resilient member exerts a spring-elastic resisting force thereon, which can be cancelled out by introduction of a pressurized fluid into said cylinder member between said piston body and said end cap, said spring-elastic resisting force acting to clamp an element to be clamped between said female clamping member and said at least one enclosing wall at the open end of said cylinder member, when said female clamping member is engaged by said external engaging means.

4,487,111
APPARATUS FOR GENERATING RECIPROCATORY MOTION

Brian E. Prince, Hailsham, England, assignor to Worcester Controls Corporation, West Boylston, Mass.

Filed Aug. 19, 1981, Ser. No. 294,130
Claims priority, application United Kingdom, Sep. 4, 1980, 8028627
Int. Cl.³ F01B 31/00
U.S. Cl. 92—110 11 Claims



1. A fluid operated actuator including a body, first and second cylinders mounted coaxially on and projecting from opposed sides of said body, a piston unit that is a one piece molding of rigid plastics material defining first and second pistons in said cylinders and a beam extending through said body between said pistons, portions of said body defining a linear bearing that slidably locates said beam to guide said piston unit for reciprocation within a restricted linear travel without permitting said piston to rotate relative to said body, said linear bearing including means defining a planar surface on said beam and means defining a planar surface in said body with said planar surfaces being in confronting relationship to one another, and means for introducing fluid under pressure into at least one of said first and second cylinders to move said piston unit from one end of its travel to the other, said fluid introducing means comprising:

a fixed port defined by portions of said planar bearing surface of said body;

a duct in said body for leading fluid to said fixed port;

a movable port defined by portions of said planar surface of said beam communicating with said at least one cylinder through a duct formed within the beam that opens through the crown of one of the pistons; and

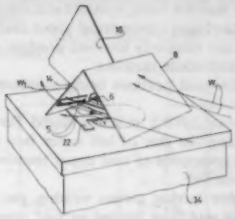
a resilient sealing member of generally oval outline that is retained in a recess in said planar bearing surface of said body to make wiping contact with said planar bearing surface of said beam and to encircle said fixed port and said movable port over the range of travel of said piston unit so that said sealing member maintains said fixed and movable ports in fluid-tight communication.

4,487,112
CHIMNEY TURNCAP

Finn Lindquist, Raagevej 21, Jägerspris, Denmark

PCT No. PCT/DK82/00005, § 371 Date Sep. 28, 1982, § 102(e) Date Sep. 28, 1982, PCT Pub. No. WO82/02586, PCT Pub. Date Aug. 5, 1982
PCT Filed Jan. 26, 1982, Ser. No. 432,906
Int. Cl.³ F23L 17/02
U.S. Cl. 98—71 5 Claims

1. A chimney turncap comprising a hood member, means for rotatably mounting the hood member on a top side of a chimney so as to be rotatable about a vertical axis, vane means for enabling an automatic adjustment of a position of the hood member in accordance with a wind direction, the hood member generally covering an opening of the chimney so as to enable a ventilation thereof in a horizontal direction through a lateral opening in the hood member, guiding means disposed inside said hood member for guiding condensed water from the inner surface of the hood member to a water outlet, a water collector communicating with the water outlet, said water collector being mounted in a top zone of the chimney in such a manner that the condensed water continually supplied into the water collector is evaporated therefrom without the water

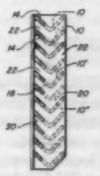


overflowing the water collector, water drains are provided on an inside of opposed walls of the hood member along lower edges thereof, the water drains being inclined so as to guide water towards an outlet end communicating with the water collector tray means, said water collector being fashioned as a tray means projecting into a central area of the hood member so as to be located at least partly above the opening of the chimney.

4,487,113
VENT ASSEMBLY AND METHOD OF MAKING SAME

David W. West, Peru; Lonnie R. Hazel, Kokomo, and John M. Frederick, Peru, all of Ind., assignors to Square D Company, Palatine, Ill.

Filed Apr. 30, 1982, Ser. No. 373,369
Int. Cl.³ F24F 7/00
U.S. Cl. 98—121 R 2 Claims



2. A method of making a vent assembly comprising the steps of: forming a plurality of generally V-shaped baffles with mounting tabs on opposite ends of the baffles,

inserting said mounting tabs through corresponding slots in a pair of generally L-shaped opposite frame members having an internal corner;

securing said tabs to their associated frame members by means of a single straight line weld along the internal corner.

4,487,114
BREWING IMPROVEMENT

Joseph D. Abdenour, 496 St. Clair, Grosse Pointe, Mich. 48230

Filed May 27, 1980, Ser. No. 153,317
Int. Cl.³ A47J 31/06
U.S. Cl. 99—295 28 Claims

1. In a brewing system for coffee, wherein the entire apparatus for brewing is designed for a single batch of brewing and is designed to be disposed of and not reused for a successive batch of brewing subsequent to the initial batch of brewing, in order to preserve the purity of each brew batch brewed with said system and maintaining each successive brew brewed with

said brewing system absolutely and completely free of any contaminants from a prior brew made with said brewing system, the improvements comprising:

brewing structure having members symmetrical about a geometric central axis thereof;

said structure having an upper member, an intermediate member and a lower member;

said upper member being symmetrical about said axis;

said intermediate member being symmetrical about said axis;

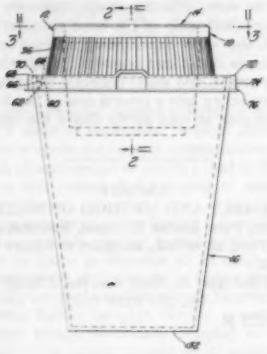
said lower member being symmetrical about said axis;

relatively raised and relatively lowered portions of the bottom of said intermediate member;

said raised and lowered portions being symmetrical about said axis;

said upper member having primary liquid flow limiting means controlling the rate of hot water into a chamber formed by the composite of said upper member and said intermediate member;

said upper member having means venting gas from said chamber during said flow limited by said primary liquid flow limiting means



said intermediate member having a central nub centered on said axis;

a filter paper portion in the shape of a circular disc having a central aperture operable to surround said nub and said nub limiting the horizontal translation of said filter paper portion horizontally away from said nub and said filter paper portion being located interiorly of said intermediate member and resting on said upper portion of the bottom of said intermediate member;

apertures arrayed symmetrically about said central axis in said bottom portion of said intermediate member and providing secondary liquid flow limiting means limiting the flow rate of brew from said chamber to said lower member;

said upper member being of a material selected from the group consisting of: plastic, coated paper, treated paper, foil, and laminated metallic foil; and

said intermediate member being of a material selected from the group consisting of: plastic, coated paper, treated paper, foil, and laminated metallic foil.

4,487,115

TOASTER

Cheng-Hsiung Su, No. 63, Fu Te 3rd Rd., Kaohsiung, Taiwan

Filed Jul. 13, 1983, Ser. No. 513,251

Int. Cl.³ A47J *37/08*

U.S. Cl. 99—327 **3 Claims**

1. An electric toaster to uniformaly toast bread comprising:

a hollow case;

heating elements within said case;

two openings through the side of said case;

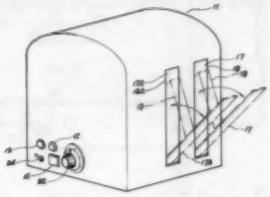
a cover for each opening;

a shaft rotatably mounted on said case and attached to said covers so that rotation of said shaft moves said covers between open and closed positions;

trapezoidal metal frames for receiving and holding slices of bread mounted on said covers so that when said covers are open said frames are disposed outside said case and when said covers are closed said frames are disposed within said case adjacent said heating elements;

an electromagnetic actuator operatively connected to said shaft to selectively rotate said shaft when energized to move said covers into the open or closed positions; and

an electronic circuit system for automatically controlling the heating time and toasting comprising,



a connector to a power source,

a touch control switch mounted to the case and operatively connected between said power source connector and said heating elements to energize said heating elements,

a timer operatively connected in the heating element circuit to control the time of energization of said heating elements,

a time adjustment means operatively connected in the timer circuit to selectively set the operation of the timer, and

a thermal actuated switch operatively connected in the timer circuit to energize the timer at a pre-set temperature,

said electromagnetic actuator being operatively connected in said timer circuit to be operated thereby.

4,487,116

CULINARY APPLIANCE FOR PREPARING SANDWICHES OF THE TYPE KNOWN AS "HAMBURGERS"

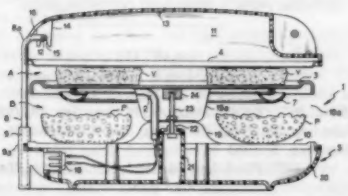
Dominique Routhier, Annecy, France, assignor to SEB S.A., Selongey, France

Filed May 17, 1983, Ser. No. 496,486

Claims priority, application France, Jan. 7, 1983, 83 00182

Int. Cl.³ A47J *37/06*

U.S. Cl. 99—339 **11 Claims**



1. A culinary appliance for preparing constituents of sandwiches of the type known as "hamburgers" by cooking at least one portion of meat and especially a portion of hashed meat and by heating bread, said appliance being constituted by:

a heating resistor having an active portion;

a hotplate having an underface placed above said resistor

and intended to receive at least one portion of meat to be cooked;

a pressure member which is intended to be applied against the portion of meat placed on the hotplate and which determines with said hotplate a first heating enclosure in which said portion of meat is located;

a second heating enclosure having a bottom surface for receiving at least one piece of bread to be heated;

a base for supporting the heating resistor, the hotplate and the pressure member, said base having a top face;

wherein said first heating enclosure and said second heating enclosure are juxtaposed and heated simultaneously by said heating resistor, at least one metallic wall being placed between said second heating enclosure and said resistor in order to limit the heating temperature within said second enclosure to the value required for the piece of bread.

4,487,117

COOKING APPLIANCE WITH LID AND OPEN WORK BASKET

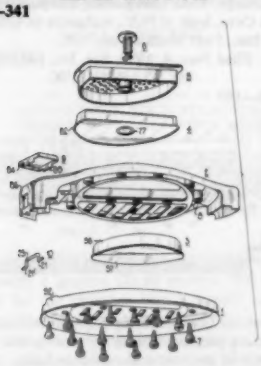
Jacques L. J. Colley, and André P. J. Vrydags, both of Liege, Belgium, assignors to ITT Industries, Inc., New York, N.Y.

Continuation of Ser. No. 373,067, Apr. 29, 1982, abandoned, which is a continuation of Ser. No. 73,779, Sep. 10, 1979, abandoned. This application Oct. 7, 1983, Ser. No. 540,104

Claims priority, application Belgium, Sep. 13, 1978, 2/57276

Int. Cl.³ A47J *37/12*

U.S. Cl. 99—341 **8 Claims**



1. A cooking appliance including: a vat for containing food during cooking, and lid means for engaging said vat, said lid means having a transparent portion forming a double window consisting exclusively of an upper window and a lower window congruently placed on top of each other and an air space sealed there-between, such that said lower window is exposed to cooking vapors emanating from said vat and said upper window is exposed to the outside atmosphere whereby improved visibility through said windows is obtained during cooking, and wherein said upper and lower windows comprise a single unitary closed shell surrounding said air space; an upper lid cover mounted on said lid means, said upper lid cover and said lid means having openings with edge sections, and wherein said upper and said lower windows are provided with external rims at the outer peripheries, said rims being mounted between said edge sections of said openings in said upper lid cover and said lid means such that windows are incorporated in said lid.

4,487,118

APPARATUS FOR CONTINUOUS PRODUCTION OF SOLID SUGAR COMPOSITIONS OR THE LIKE

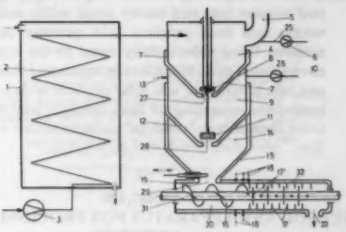
Otto Hänsel, Hanover, and Klaus Markwardt, Laatzen, both of Fed. Rep. of Germany, assignors to Otto Hänsel GmbH, Hanover, Fed. Rep. of Germany

Filed Dec. 18, 1981, Ser. No. 331,968

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1980, 3048904

Int. Cl.³ B01F *13/06, 7/02*

U.S. Cl. 99—348 **4 Claims**



1. Apparatus for continuous production of a mass to be processed into hard candy from a solution of sugar, water, and glucose that is cooked, steamed out, and dewatered with the resulting mass transferred to mixing means for further processing, comprising: a continuous boiler for sugar solutions; downstream first steaming-out and vacuum compartment means connected to a vacuum pump; and mixing and extracting means for candy mass that is to be further processed; second vacuum compartment means connected to, and downstream from, said first steaming-out and vacuum compartment means, said first steaming-out and vacuum compartment means being connected to said boiler; reservoir means and a passage with blocking means, said first compartment means being connectable to said reservoir means through said passage, said passage being blockable by said blocking means; said reservoir means being positioned below said first compartment means; extraction compartment means having a conveyor and communicating with said reservoir means; and mixer means connected downstream to said extraction compartment means.

4,487,119

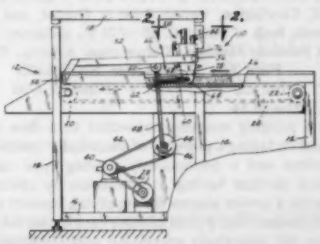
MEANS FOR INJECTING FLUIDS INTO MEAT PRODUCTS

Ray T. Townsend, Des Moines, Iowa, assignor to Townsend Engineering Company, Des Moines, Iowa

Continuation of Ser. No. 42,315, May 25, 1979, Pat. No. 4,292,889. This application Aug. 17, 1981, Ser. No. 293,687

Int. Cl.³ A23B *4/02;* A23L *3/32*

U.S. Cl. 99—487 **8 Claims**



1. A machine for injecting fluid into a food product compris-

ing meat, fish or poultry which include both fat and lean portions,

a frame means for supporting a food product,

a plurality of needles movably mounted on said frame,

means for causing said needles to penetrate and then withdraw from said food product to create a plurality of cavity voids in said product defined by the shape of the portion of each needle that penetrates said product,

fluid means connected to said needles for injecting fluid into said cavities,

and fluid control means operatively connected to said frame means for injecting a metered quantity of fluid through said needles into said cavity voids while said needles are within said food product, said quantity of fluid being metered being substantially equal to the volume of said cavity voids so as to uniformly inject said fluid into the fat and lean portions of said food product without creating an immediate migration of fluid through said lean portions more than through said fat portions at the time of injection.

4,487,120

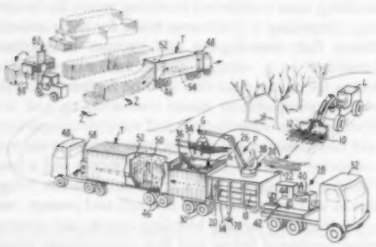
METHOD AND APPARATUS FOR PROCESSING BRUSH CUTTINGS

James H. Barstow, 1281 N. Pepper St., Turlock, Calif. 95380

Filed Apr. 15, 1983, Ser. No. 485,235

Int. Cl.³ B30B *9/00*

U.S. Cl. 100—40 **12 Claims**



1. A method of processing elongate brush cuttings by compressing the cuttings within a compaction chamber having a plunger movable longitudinally therethrough, said method comprising: loading the cuttings into the compaction chamber in an orientation extending generally parallel to the longitudinal direction of plunger movement; moving the plunger longitudinally through the chamber to compress cuttings and force them into an orientation extending generally normal to the direction of plunger travel; and, discharging the cuttings from the chamber while maintaining said orientation.

4,487,121

FAULT PROTECTION SYSTEM FOR A LINE PRINTER

James E. Carrington, Vestal; John S. Gregor, and Gerald R. Westcott, both of Endicott, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 30, 1984, Ser. No. 574,828

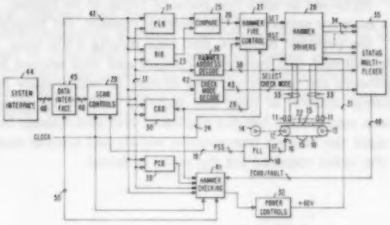
Int. Cl.³ B41J *1/18, 3/42;* **H02H** *3/00*

U.S. Cl. 101—93.14 **17 Claims**

1. In a printing machine connected to a data processing means and including a plurality of electrically operable impression devices and a continuously moving type carrier, said impression devices having a connection by circuit breaker means with a power source for supplying current to said impression devices, and a print control means operable in a print operation for selectively energizing said impression devices with operating current from said source in synchronism with the movement of said type carrier to effect printing of data transmitted from said data processing means, a protection system associated with said print control means comprising

detection means for sensing fault current in any of said impression devices during the non-print operation of said print control means,

fault location means operable in response to a fault signal from said detection means during the non-print operation



of said print control for individually checking said impression devices and identifying the origin of said fault current signal, and

means operable upon completion of checking by said fault location means for operating said circuit breaker means to disconnect said impression devices from said power source.

4,487,122

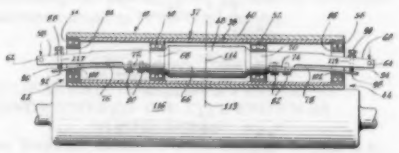
DEFLECTION COMPENSATING ROLL FOR PROVIDING UNIFORM CONTACT PRESSURE

Harvey F. George, West Hampstead, and Robert H. Oppenheimer, Glen Cove, both of N.Y., assignors to Gravure Research Institute, Inc., Port Washington, N.Y.

Filed Nov. 4, 1983, Ser. No. 548,640

Int. Cl.³ B41F *9/00*

U.S. Cl. 101—153 **39 Claims**



1. A system for compensating for roll deflection to provide uniform contact pressure across the width of a web disposed between a pair of counter rollers, comprising:

a first roller mounted for rotation;

a second roller mounted for rotation about a deflectable shaft;

pressure applying means coupled to the ends of said deflectable shaft for moving said second roller into contact with said first roller;

said second roller including an outer shell mounted for rotation relative to said deflectable shaft;

a pair of end bearings disposed adjacent the ends of said outer sleeve and a pair of main bearings disposed inwardly from said end bearings a predetermined distance to transmit the applied pressure uniformly over the face width of said second roller when said second roller is used with a flexible first roller;

self-adjusting deflection compensating means arranged proximate to said deflectable shaft for applying pressure to the ends of said outer shell in response to the deflection of said deflectable shaft by said pressure applying means to provide uniform pressure across the face width of said second roller when said second roller is used with a first roller

having a high resistance to bending said self-adjusting deflection compensating means including spring means coupled proximate to each end of said second roller internally thereof; and adjustable spring engagement means for deflecting said spring means to adjust the pressure applied to the ends of said second roller; said self-adjusting deflection compensating means applying a downward force to the ends of said second roller when said deflectable shaft is deflected downwardly a predetermined distance.

4,487,123

SHOCK AND OSCILLATION REDUCING SYSTEMS FOR PRINTING MACHINE CYLINDERS

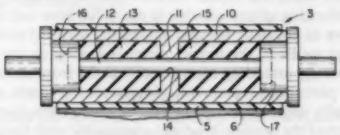
Ingo Köbler, Anhausen; Herbert Stockel, Augsburg; Lutz Mauer, Friedberg, and Albert Engl, Warngau, all of Fed. Rep. of Germany, assignors to M.A.N. Roland Druckmaschinen Aktiengesellschaft, Offenbach am Main, Fed. Rep. of Germany

Filed Aug. 10, 1983, Ser. No. 521,654

Claims priority, application Fed. Rep. of Germany, Aug. 13, 1982, 3230120

Int. Cl.³ B41F *5/00*

U.S. Cl. 101—216 15 Claims



1. In a rotary printing machine having a hollow first cylinder (3) formed with a groove (7) to receive end portions of a covering (5) for the cylinder, and a second cylinder (4) in surface engagement with said first cylinder,

means including a movable mass for reducing the shock on the first cylinder, when, in operation, the groove thereof rolls over the second cylinder,

comprising, in accordance with the invention a member (11) extending transversely within the cylinder (3), said member transferring oscillations and shocks from the wall of the cylinder;

an absorber rod (12) extending parallel to the groove (7) of the cylinder (3) fitted within the cylinder, and positively secured to the cylinder only through the transversely extending member (11) such that oscillations and shocks are transferred thereto and are thereby subjected to deflecting forces;

a damping mass (13, 15) filling the space within the cylinder, embedding said absorber rod, (12) and dissipating shocks and oscillations transferred to said damping mass by the transversely extending member (11) via said absorber rod,

and blades, (18) extending circumferentially from axially opposite ends of said absorber rod (12) and embedded within said damping mass (13, 15) the ends of said blades being spaced from the inside of said hollow cylinder.

4,487,124

SHOCK AND OSCILLATION REDUCING APPARATUS FOR PRINTING MACHINE CYLINDERS

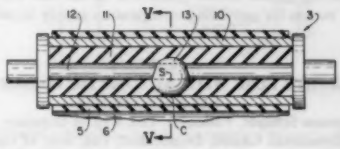
Ingo Köbler, Anhausen; Herbert Stöckl, Augsburg; Peter Meinke, Steinbach; Albert Engl, Warngau, and Hatto Hechler, Augsburg, all of Fed. Rep. of Germany, assignors to M.A.N. Roland Druckmaschinen Aktiengesellschaft, Offenbach am Main, Fed. Rep. of Germany

Filed Aug. 10, 1983, Ser. No. 521,655

Claims priority, application Fed. Rep. of Germany, Aug. 13, 1982, 3230118

Int. Cl.³ B41F *5/00*

U.S. Cl. 101—216 14 Claims



1. In a rotary printing machine having a hollow first cylinder (3) formed with a groove (7) to receive end portions of a covering (5) for the cylinder,

a second cylinder (4) in surface engagement with the first cylinder,

and an apparatus including a movable mass for reducing the shock on the first cylinder, when in operation, the groove of the first cylinder rolls over the second cylinder,

comprising

an elastic rod (12) located within the cylinder and secured at its axial ends to the cylinder;

a solid inertia mass (13) secured to the elastic rod, through which the elastic rod extends such that the mass has a center of gravity (S) located between the center axis of the cylinder and the inner surface of said hollow cylinder (3), when said cylinder (3) is at rest and is held, by the elastic rod, in contact with said inner surface of the hollow cylinder when the cylinder (3) is rotating;

and a damping mass (11) filling the interior of the hollow first cylinder (3) and embedding the elastic rod (12) and said inertia mass in said position in which the mass (13) is in contact engagement with the inner surface of the wall (10) of the cylinder (3).

4,487,125

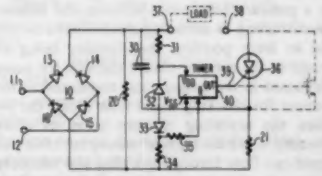
TIMING CIRCUIT

Borys Zuk, Somerville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 5, 1982, Ser. No. 405,451

Int. Cl.³ F42C *11/06*

U.S. Cl. 102—220 10 Claims



1. A circuit for energizing a load after a predetermined interval comprising:

a timer having a reset terminal and an output terminal for producing a control pulse which is initiated at a predeter-

mined time after removal of a reset signal from the reset terminal;

energy storing means;

switch means having a control terminal connected to the output terminal of said timer, said switch means being serially connected in a closed loop with said load and the energy storing means;

means for applying an external potential to charge the energy storing means;

circuit means for applying a reset potential to said timer reset terminal when said external potential is applied and for applying a non-reset potential derived from said energy storing means in the absence of said external potential; and

further circuit means connected across said energy storing means for providing energization supply to said timer.

4,487,126

SAFETY FUSE WITH AUTOMATIC UNDERWATER SELF-DISARMING

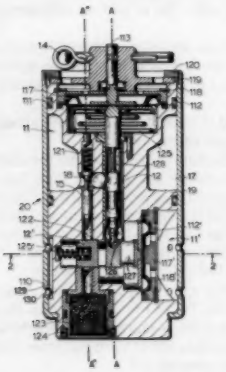
Hermann Schaper, Vallendar, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Mar. 4, 1983, Ser. No. 472,003

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1982, 3207700

Int. Cl.³ F42C *3/00, 5/00*

U.S. Cl. 102—229 **12 Claims**



1. A pressure-actuated fuse comprising:

a housing formed with an inner chamber and with a passage having an outer end opening to the exterior and an inner end opening into the chamber;

a plug in the passage having a porosity sufficient to allow slow liquid flow through itself;

an actuating element exposed inwardly in the chamber and outwardly to the exterior and displaceable in the housing by a pressure differential between the chamber and the exterior along an actuating axis between an outer position and an inner position, the chamber being substantially closed to the exterior except through the passage;

valve means in the passage and connected to the actuating element for blocking liquid flow along the passage only when the actuating element is in its outer position, whereby when the element moves out of its outer position liquid can flow through the plug and limitedly along the passage into the chamber;

spring means braced between the housing and the actuating element for urging same into its outer position, whereby only when the exterior pressure effective inwardly on the element is greater than the spring force can the element move into its inner position;

a detonator in the housing;

a firing member in the housing displaceable into a firing position engaging and exploding the detonator; and

link means for blocking the firing member from moving into the firing position except when the actuating element is in its inner position.

4,487,127

PERCUSSION FUSE

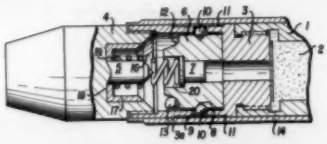
Willi Läebbers, Trittau, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Dec. 8, 1982, Ser. No. 447,881

Claims priority, application Fed. Rep. of Germany, Dec. 12, 1981, 3149346

Int. Cl.³ F42C *1/00*

U.S. Cl. 102—253 **6 Claims**



1. In an explosive projectile disposed in a cartridge separable upon firing of the projectile and having a charge-containing projectile body and an ignition head disposed forwardly of and in spaced relation to the projectile body, an improved percussion fuse assembly having a fuse body interconnecting the projectile body and ignition head, said fuse body having a fixed cylindrical portion containing at least one radial bore therethrough, an impact member lockably supported for axial movement in the fixed cylindrical portion between a rearmost rest position and a foremost impact position, the impact member having an annular groove disposed in the periphery thereof in radial alignment with the radial bore of the cylindrical portion when the impact member is in its rearmost position, a first blocking sphere seatable in the radial bore and the annular groove to normally prevent substantial forward motion of the impact member, the impact member having an inwardly and rearwardly extending central recess in the front surface thereof and a percussion cap mounted in said central recess; a firing pin centrally disposed in and extending rearwardly from the rear surface of the ignition head and engageable with the percussion cap when the impact member is in its front most position and a second inertial sphere disposed between the ignition head and impact member and adapted to be clamped therebetween at premature deceleration of the projectile; the improvement comprising, in combination,

said ignition head having a rearwardly extending blind bore and said impact member having an annular recess coaxially disposed on its front surface thereof; and

a housing slidably movable in the longitudinal axial direction in said blind bore of said ignition head which housing is coaxially mounted relative to said firing pin.

4,487,128

SAFETY RING/FIRING PIN FOR EXPLOSIVE DEVICE

Peter H. Van Sloun, Hopkins, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 4, 1982, Ser. No. 432,588

Int. Cl.³ F42C *15/22*

U.S. Cl. 102—261 **1 Claim**

1. A device comprising in part one fixed member locked to a second movable member by means of a pin passing through both said members and a locking and unlocking means to control the position of said pin, said locking and unlocking means comprising:

(a) a first bore through said fixed member;

(b) a second bore through said movable member;

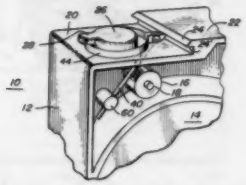
(c) said pin having a cross-section less than that of said bores,

and normally positioned so that (i) one end portion is in first said bore and (ii) the other end portion thereof is in second said bore;

(d) a lock tang spaced from said first bore;

(e) an overhanging shoulder means adjacent to said first bore opposite from said lock tang; and

(f) a flexible circular locking and unlocking ring formed from a strip of resilient material, the two ends of said strip (i) having ends which normally engage said overhanging shoulder and (ii) being pivotally connected to opposite sides of the end of said pin, the circumferential side of said ring opposite from said pin attachment side normally being positioned under said lock tang and the ends of said



ring being positioned under said overhanging shoulder, the said ring thereby being captivated by said lock tang, said shoulder, said pin, and said fixed member; said ring, upon radial pressure applied from diametrically opposite points between said lock tang area and said overhang area, being distorted so that said circumferential side thereof may be lifted over said tang; thereafter further lifting of said ring causing a rotation thereof about said pivotal connection causing said ends of said ring to become spread away from said overhanging shoulder; thereafter said pin being manually extracted from both said bores to complete unlocking of said second movable member from said first fixed member.

4,487,129

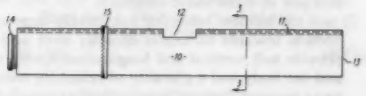
METHODS OF AND CONTAINERS FOR IGNITING EXPLOSIVES

Stanley N. Isaac, 6 Falstone Crescent, Ashington, Northumberland N.E. 63 Oty, England

Filed Oct. 5, 1983, Ser. No. 539,142

Int. Cl.³ F42D *3/00*

U.S. Cl. 102—313 **5 Claims**



1. A container for explosive material comprising a substantially rigid tube of plastics material, a recess in the wall of the tube between its ends large enough to house a detonating cartridge, at least two locating means of plastics material rigidly attached to the tube, at least one of said means being on each side of said recess, said means being adapted to locate a detonating line on opposite sides of said recess, and projecting resilient means of plastics material fixed to the outside of the tube and adapted to permit movement of the tube down a bore hole but to engage the walls of the hole to prevent it from floating up, and means for closing the ends of the tube, the capacity of the tube being much greater than the recess so as to be suitable for containing a main charge of explosive.

4,487,130

HOLLOW CHARGE

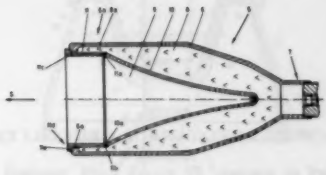
Leif Brattström; Stig Hallström; Bo Gustavsson, all of Karlskoga, Sweden, and Kjell Mattsson, San Leandro, Calif., assignors to AB Bofors, Bofors, Sweden

Filed Jan. 10, 1983, Ser. No. 456,908

Claims priority, application Sweden, Jan. 15, 1982, 8200195

Int. Cl.³ F42B *1/02*

U.S. Cl. 102—476 **14 Claims**



1. An improved explosive charge of causing a primary effect in which a hole is made in a wall of a target and a secondary effect in which charge material passes through the hole into the target, said explosive charge comprising:

a body of explosive material;

an outwardly opening cavity formed in said body, said cavity enlarging toward the burst direction of said charge, said cavity being lined with a layer of metal so that upon initiation of said charge a forwardly directed penetrating jet of high velocity material is formed for causing said primary effect, said jet being followed in the burst direction by a slug of comparatively low velocity material; and

a substantially cylindrical, annular body separate from said metal layer, said annular body having a rearward end in contact with the forward end of said metal layer so that upon initiation of said charge, said annular body deforms to generate a separate part of said jet, said separate part being in the form of a projectile which follows closely the rear portion of said jet for causing said secondary effect, said separate part having a velocity substantially the same as the velocity of the rear portion of said jet, whereby said separate part can penetrate and enlarge a hole made in a target to facilitate passage of said slug.

4,487,131

CARTRIDGE AMMUNITION

Hans W. Luther, Kaarst, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Sep. 17, 1981, Ser. No. 303,075

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1981, 3037662

Int. Cl.³ F42B *13/16*

U.S. Cl. 102—523 **15 Claims**

1. Cartridge ammunition comprising

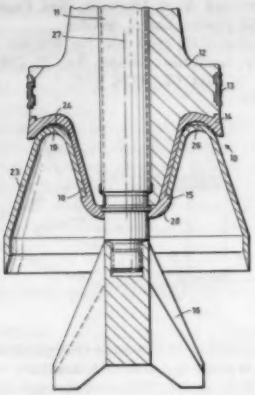
a sub-caliber shell;

a sabot having an end facing rearwardly which sabot is detachably mounted on the shell;

said end surface including at least one stepped portion; and

a propellant case including a cartridge cover connection with said end surface of said sabot, said cartridge cover includes a flexible radially innermost portion which is biased radially outwardly when contacting said stepped portion, a minimum diameter of said radially innermost portion being smaller than a maximum diameter of said

stepped portion, whereby when said cartridge cover is fully assembled with said sabot it makes conjugating



contact with end surface and snap inwardly so as to form an essentially non-detachable connection with said sabot.

4,487,132

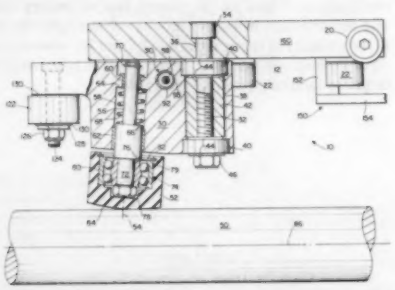
CONVEYING SYSTEM

Gilbert Fuchs; Norman Crowley, and Randall Wink, all of Evansville, Ind., assignors to Evana Tool and Engineering, Inc., Evansville, Ind.

Filed Aug. 17, 1982, Ser. No. 408,817

Int. Cl.³ B61B *13/12*

U.S. Cl. 104—166 **18 Claims**



1. A conveying system for moving an object along a straight path comprising:

a pallet on which the object is conveyed;

track means for mounting said pallet for straightline movement;

a cylindrical drive shaft disposed adjacent and parallel to said track means and having a longitudinal axis about which said drive shaft rotates;

a drive roller rotatable about an axis and having an axial face;

mounting means for mounting said drive roller to said pallet for rotation such that the axis of rotation of said drive roller is disposed at an acute angle with respect to the longitudinal axis of said drive shaft and such that said axial face of said drive roller tangentially contacts said drive shaft whereby said pallet is driven along said track means.

4,487,133

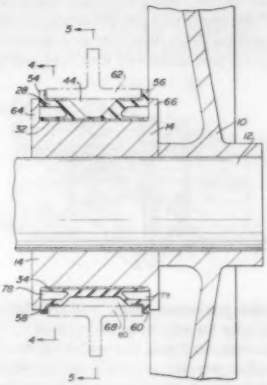
PRIMARY SUSPENSION SYSTEM FOR PROVIDING LOW VERTICAL AND LONGITUDINAL SPRING RATES IN A RAILWAY CAP

Walter S. Eggert, Jr., Huntington Valley, Pa., assignor to The Budd Company, Troy, Mich.

Filed Sep. 24, 1982, Ser. No. 425,034

Int. Cl.³ B61F *5/30*

U.S. Cl. 105—224.1 **1 Claim**



1. In a railway truck for supporting a car body and having a side frame for receiving a wheel-axle unit disposed to ride in a journal bearing having a pair of outwardly extending flanges,

a primary suspension spring disposed between said side frame and said journal bearing comprising:

(a) top and bottom plate members;

(b) a pair of elastomeric members forming top and bottom half elements bonded to said top and bottom plate members disposed around the axle of said wheel-axle units;

(c) said top and bottom plate members including projecting edges extending therefrom to receive a pair of clips to secure together said top and bottom plate members;

(d) said top element includes a pair of upwardly extending flanges disposed between the flanges of said journal bearing and an upper portion of said side frame to provide lateral restraint of said top element;

(e) said bottom elements include a pair of downwardly extending flanges disposed between the flanges of said journal bearing on a lower portion of said side frame to provide lateral restraint of said bottom element without effecting the vertical and longitudinal spring rates of said pair of elastomeric members;

(f) said top element including a relatively large cut-away portion towards its center directly over said axle to provide soft vertical and longitudinal spring rates for said car body and a plurality of relatively narrow cut-away portions disposed longitudinally towards the front and rear of said large cut-away portion towards the vertical tangents of said axle to provide support for said car body;

(g) said relatively large cut-away portion of said top element includes a pair of angularly shaped elastomeric portions of material disposed laterally in said top element and extending in opposite outward directions, and further having open areas on both sides of said elastomeric portions whereby greater deflection is provided to accomplish a low spring rate within the constraints of the elastomeric material in said members; and

(h) said bottom element including a second relatively large cut-away portion disposed below said axle with at least one relatively small cut-away portion disposed longitudinally towards the front and rear of said second

relatively large cut-away portion towards the tangents of said axle.

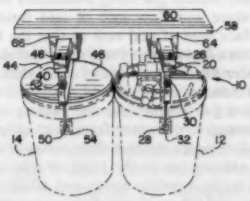
4,487,134
PORTABLE WORKTABLE
Daniel J. Foote, 7323 Wellauer Dr., Wauwatosa, Wis. 53213
Filed Aug. 2, 1982, Ser. No. 404,363
Int. Cl.³ A47B *23/00*
U.S. Cl. 108—44 **5 Claims**

1. A device for use with a shopping cart to provide a portable worktable, comprising:

a flat table member having a planar work surface supportable by the side and front walls of a shopping cart, said table member having a width and length sufficient to substantially cover the open top of a cart; and

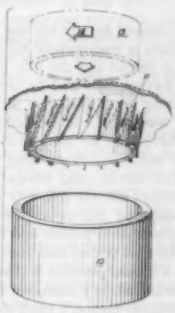
means on said table member for removably retaining said table member on a cart, said retaining means includes a pair of stop members engageable with the walls of a shopping cart which depend from the undersurface of said table member and are in spaced relation to one another adjacent opposite side edges of said table member, said stop members being positioned to butt against the side walls of a cart to prevent widthwise shifting of said table member when the table member is positioned on a cart and further includes a retaining member which depends from the undersurface of said table member adjacent its front edge and is engageable with the front wall of a shopping cart, said retaining member includes a channel-shaped opening extending widthwise of said table member for receiving the upper end of the front wall of the cart to prevent lengthwise shifting of said table member when the table member is positioned on a cart, said channel-shaped opening being spaced from the undersurface of said table member to elevate the front of said table member so that said work surface is in a substantially horizontal position.

4,487,135
TOOL AND IMPLEMENT CARRIER
John Van Ryn, 5525 W. 145th St., Midlothian, Ill. 60445
Filed Jul. 1, 1982, Ser. No. 394,458
Int. Cl.³ A47B *35/00*
U.S. Cl. 108—50 **10 Claims**



1. An apparatus useful by at least one person for holding tools and other implements comprising first holding means defining a first space capable of holding said tools; first support means associated with said first holding means; second holding means, physically separate from said first holding means, defining a second space capable of holding said other implements; second support means associated with said second holding means; and platform means associated with both said first and second holding means, and capable of being supported by both said first and second support means and including at least one substantially flat surface capable of supporting the weight of said person.

4,487,136
PALLET LEG FOR A CORRUGATED CARDBOARD PALLET
Bruce C. Beckway, River Forest, Ill., assignor to Packaging Materials Corporation, Chicago, Ill.
Filed Dec. 27, 1982, Ser. No. 453,760
Int. Cl.³ B65D *19/22, 19/40*
U.S. Cl. 108—51.3 **2 Claims**



1. In a corrugated cardboard pallet including a table member having tubular leg members comprised of inner and outer leg elements affixed thereto said tubular leg members comprising:

a. a plurality of die-cut finger elements formed in said table member by die-cut lines radiating outward from a central circle and terminating on a circular score line of substantially the same diameter as the inner diameter of the outer leg element;

b. the die-cut lines radiating tangentially outward from the periphery of the inner die-cut circle to meet the outer circular score line, thereby forming a substantially spiral pattern;

c. an inner leg element having a length substantially corresponding to the length of said finger elements;

d. an outer leg element proportioned to receive therein said inner leg element with said finger elements retained in the annulus formed between said outer and inner leg elements, said tubular leg members being provided by placing an outer leg element under said table member and aligned with said circular score line and an inner leg element atop said table member and aligned with said circular score line;

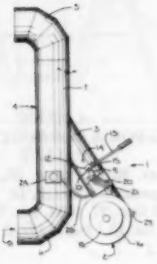
e. said inner leg element being inserted into said outer leg element with said finger elements being captured between said outer and inner leg elements by pressing said inner leg element through said table member into said outer leg element;

f. said finger elements being adhesively secured to both of said outer and inner leg elements over substantially the entire surface area of each said finger element.

4,487,137
AUXILIARY EXHAUST SYSTEM

George T. Horvat, 1319 S. 102nd St., West Allis, Wis. 53214, and Stephen D. Horvat, 211 N. 36th St., Milwaukee, Wis. 53208

Filed Jan. 21, 1983, Ser. No. 459,816
Int. Cl.³ F23L 17/16; F23N 3/00
U.S. Cl. 110—160 6 Claims



1. An auxiliary exhaust system for use with a flue having a flue wall that defines a passageway for venting products of combustion such as smoke and the like, comprising:

conduit means having first and second ends, said conduit means projecting from said flue and communicating at said first end with an opening formed in the flue wall;

blower means having an air inlet located exteriorly of said flue and an air outlet communicating with said second end of said conduit means, said blower means operable to introduce auxiliary air into said flue with a velocity component extending in the downstream direction of the products of combustion within said flue;

damper means located within said conduit means and movable between a closed position and an open position; said damper means including a rotatable shaft journaled in the walls of the conduit means, a plate mounted on said plate and dimensioned to substantially conform to the interior configuration of said conduit means, cam means mounted on said shaft and lever means connected to said cam means for rotating said cam means and shaft, and

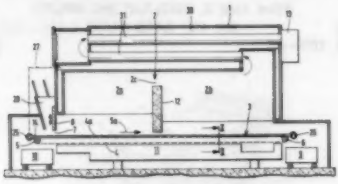
blower control means including a normally open push button switch engageable by said cam means, and circuit connections connecting said blower means to a source of electric current through said push button switch so that when said damper means is in its open position said push button switch is engaged by said cam means and applies electric current to start said blower means.

4,487,138
TRAVELING GRATE FOR A FURNACE

Gerhard Grebe, Schlossbergstrasse 7, D-6345 Eschenburg Roth, Fed. Rep. of Germany

Filed Dec. 14, 1982, Ser. No. 449,796
Claims priority, application Fed. Rep. of Germany, Dec. 15, 1981, 3149548
Int. Cl.³ F23H 11/00
U.S. Cl. 110—269 17 Claims

1. A traveling grate for a furnace, comprising: two horizontally extending pipes which are parallel and horizontally spaced, each said pipe having thereon a guide flange which extends longitudinally thereof and projects horizontally toward the other of said pipes; means for facilitating flow of a cooling fluid through said pipes; an endless chain and means movably supporting said endless chain so that an upper reach thereof is disposed between, extends substantially parallel to, and moves in a direction substantially parallel to said pipes; and a plurality of grate plates supported on said endless chain at respective locations therealong, each said grate plate on said upper reach of said endless chain being above said upper reach, extending generally horizontally, and having each of its lateral edges slidably engaging an upper surface of a respective one of said guide flanges on said pipes; including a plurality of said parallel, horizontally extending, horizontally spaced pipes,

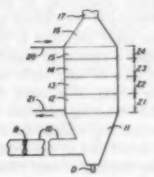


each said pipe having two said guide flanges located on diametrically opposite sides thereof; and including a plurality of said endless chains having said plural grate plates supported thereon, the upper reach of each said endless chain being disposed between and extending parallel to a respective pair of said pipes.

4,487,139
EXHAUST GAS TREATMENT METHOD AND APPARATUS

Donald F. Warner, Latham, N.Y., assignor to Heat Exchanger Industries, Inc., Latham, N.Y.

Continuation-in-part of Ser. No. 81,789, Oct. 4, 1979, abandoned, and Ser. No. 252,297, Apr. 9, 1981, abandoned. This application Aug. 10, 1982, Ser. No. 406,774
Int. Cl.³ F23J 11/00
U.S. Cl. 110—345 33 Claims



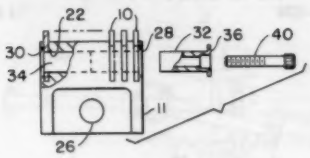
1. The method of recovering heat energy contained in a hot exhaust gas containing water vapor and sulfur trioxide combinable in part to form sulfuric acid, and of simultaneously removing substantial amounts of said sulfur trioxide from the exhaust gas, which comprises the steps of: passing said exhaust gas in heat exchange flow relationship generally perpendicularly to and between generally horizontally extending tubes of a tube nest having a plurality of tube groups; and simultaneously passing a fluid to be heated through successive tubes of said nest in counterflow relationship to said exhaust gas flow, the flow rate of said exhaust gas being established in relation to the input temperature and flow rate of said fluid and the heat exchange surface area of said nest so that the temperature of said fluid within a first group of said tubes remains substantially below the water vapor dewpoint of said exhaust gas, thereby transferring a substantial portion of the latent heat energy in said hot exhaust gas to said fluid and causing continuous substantial condensation of water from said exhaust gas and a continuous fall of water droplets from tubes of said first group through said exhaust gas to the tubes of a lower tube group, whereby said water droplets entrap and dilute sulfuric acid as they fall from said tubes of said first group through said exhaust gas, and said water droplets wash sulfuric acid from said tubes of said lower group, the exterior surfaces of said tubes of said tube nest being covered with coverings which both shield said tubes from sulfuric acid and promote dropwise condensation.

4,487,140

METHOD TO REPLACE LOOPER ELEMENTS

Billy E. Inman, LaGrange, Ga., assignor to Milliken Research Corporation, Spartanburg, S.C.

Division of Ser. No. 456,628, Jan. 10, 1983, abandoned. This application Feb. 6, 1984, Ser. No. 577,350
Int. Cl.³ D05C *15/90*
U.S. Cl. 112—79 R 8 Claims



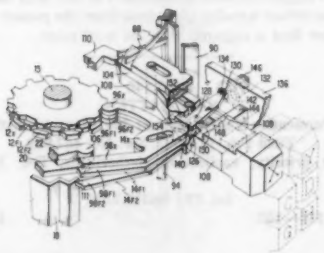
1. A looper module for a tufting machine comprising: a block member, a plurality of loopers mounted in said block member, said block member having an opening transversely therethrough, each of said loopers having an opening therein coinciding with the opening in said block member, sleeve means projecting through said opening in said block and said openings in said loopers and means retaining said sleeve means in said openings.

4,487,141

FORCE AMPLIFYING ARRANGEMENT FOR SEWING MACHINE PUSHBUTTON CONTROL

William Weisz, Tenafly, N.J., assignor to The Singer Company, Stamford, Conn.

Filed May 29, 1984, Ser. No. 614,581
Int. Cl.³ D05B *3/02*
U.S. Cl. 112—158 C 8 Claims



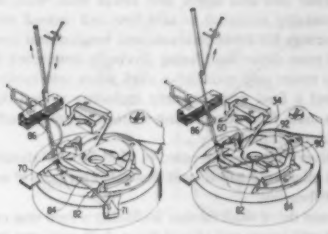
1. In a sewing machine, a needle bar, mechanism for displacing the needle bar, feed regulating mechanism, a plurality of cams, a cam follower for each cam, a pushbutton inwardly movable against one of the cam followers for operably connecting the associated cam with one of the said mechanisms, a floating extension for said pushbutton inwardly movable by the pushbutton, a toggle which is movable by the floating extension and has one end disposed for engagement with fixed structure, the opposite end of the toggle being disposed to engage a second follower as the floating extension is moved inwardly by the pushbutton and thereby operably connect the second follower associated cam with the other of said mechanisms.

4,487,142

BOBBIN CASE CHAIN STITCH INSERT

Donald Rodda, Butler, and Charles R. Odermann, Montville, both of N.J., assignors to The Singer Company, Stamford, Conn.

Filed Apr. 14, 1983, Ser. No. 484,777
Int. Cl.³ D05B *1/14, 57/04*
U.S. Cl. 112—168 2 Claims



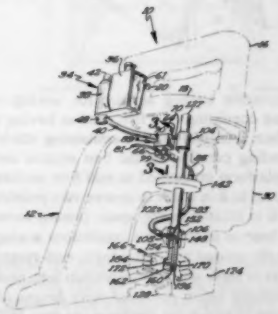
1. In a lock stitch sewing machine, a sewing needle, a stationary bobbin case, a looptaker to pick up a loop of thread presented thereto by the needle and carry the loop about the bobbin case, a post to hold the loop after cast off from the looptaker and so permit the needle to penetrate the held loop while presenting a new loop to the looptaker for movement thereby around the bobbin case, means for stripping the held loop from the post after penetration by the needle, and a stationary insert within the bobbin case, said insert including a ledge which overlaps a top surface of the bobbin case and including a depending flange under the ledge, the ledge being disposed to capture thread thereunder from an upper limb of the new loop being moved about the bobbin case whereby movement of the new loop across the bobbin case is delayed and the looptaker is enabled to pull a loop stripped from the retaining post up to material being sewn for the setting of a chain stitch therein, the insert including means for elevating said upper limb of thread and thereby causing the thread to be moved out from under and over said ledge.

4,487,143

SELF-OILING BAG-CLOSING SEWING MACHINE WITH IMPROVED LUBRICATION SYSTEM FOR DRIVE SHAFT AND FEED DOG ASSEMBLY

Andrew J. Hiltner, Minneapolis, Minn., assignor to Axia Incorporated, Minneapolis, Minn.

Filed May 25, 1983, Ser. No. 498,265
Int. Cl.³ D05B *71/00*
U.S. Cl. 112—256 15 Claims



1. In combination with a self-oiling, portable, bag-closing sewing machine energizable from a power source and includ-

ing a housing; an oil source carried by said housing and capable of storing oil; first and second main drive shaft bearings positioned along a common axis, and each said bearing having an inner and outer periphery with at least one of said bearings having a first oil entry port passing between said outer periphery and said inner periphery; and driving means selectively connectable to the power source, carried by said housing, and including a motor and a main drive shaft having a central longitudinal axis and upper and lower ends with said shaft being rotatably mounted in said first and second main drive shaft bearings for rotation about said longitudinal central axis and said main drive shaft being drivingly connected with said motor to rotate said main drive shaft when said motor is energized; and a feed dog assembly including a feed dog block having a main feed dog bearing therein; an improved lubrication system comprising:

oil delivery means connected in fluid flow relationship with said oil source and to said first oil entry port of said drive shaft bearing;

said main drive shaft further including a feed dog cam adjacent said lower end of said drive shaft, said cam having an outer periphery and being rotatably journaled in said main feed dog bearing to move said feed dog block along an eliptical path in response to rotation of said drive shaft;

said main drive shaft including an oil guideway extending from said first oil entry port to said feed dog cam, said guideway receiving oil from said first oil port and directing such oil to said outer periphery of said feed dog cam to lubricate said cam and said main feed dog bearing.

4,487,144

SEWING MACHINE PIVOTABLE WORK SUPPORT

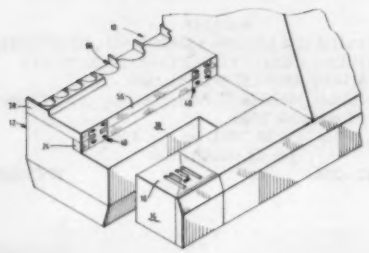
Nereo Bianchi, Pavia, Italy, assignor to NECCHI Societa per Azioni, Pavia, Italy

Filed Sep. 29, 1982, Ser. No. 426,954

Claims priority, application Italy, Jan. 19, 1982, 42901 A/82

Int. Cl.³ D05B *73/10*

U.S. Cl. 112—260 **3 Claims**



1. A transformable sewing surface for sewing machines formed of a base consisting of a first section having an upper and lower surface, a second section containing stitch-forming members, extending parallel to said first section and spaced from it, and a platform connected to said first section so as to swing with respect to it in order to assume two positions, in the first of which it is located in the space present between said sections of the base so as to form a continuous sewing surface with it while in the second position it turns with respect to said first section so as to leave said second section free, said connection of said platform being provided with hinges of flexible material by means of which the platform can turn 180° as to be swung from said first position in which it rests on the lower surface of said first section to said second position where said flap rests on the upper surface of said first section.

4,487,145

PRESSER FOOT DRIVE LINKAGE IN A SEWING MACHINE

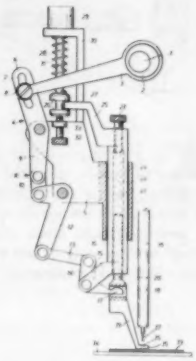
Kurt Vollmar, Weilerbach, Fed. Rep. of Germany, assignor to Pfaff Industriemaschinen GmbH, Fed. Rep. of Germany

Filed Jul. 30, 1982, Ser. No. 404,335

Claims priority, application Fed. Rep. of Germany, Aug. 13, 1981, 3132044

Int. Cl.³ D05B *27/04, 29/02*

U.S. Cl. 112—320 **12 Claims**



1. A presser foot arrangement for a sewing machine including a presser bar having a presser foot mounted thereon and movable upwardly and downwardly, spring means biasing said presser foot in a downward direction toward engagement with a workpiece and an eccentric drive connected to the sewing machine, the arrangement including a pivotal driver member engagable with the presser foot to raise the presser foot and being releasable from the presser foot to permit the presser foot to be biased into engagement with the workpiece, and a drive mechanism connected between said driver member and the eccentric drive and including a toggle mechanism made of at least two toggle members which are pivotably connected to each other and which have an extended position with said at least two toggle members substantially in line with each other, when said driver member is released from the presser foot and the presser foot is engaged with the workpiece.

4,487,146

SAIL BATTEN

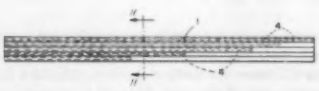
Jan A. Parmentier, Enschedestraat 300, Hengelo, Netherlands

Filed Feb. 18, 1983, Ser. No. 467,989

Claims priority, application Netherlands, Feb. 23, 1982, 8200716

Int. Cl.³ B63H *9/04*

U.S. Cl. 114—102 **11 Claims**



1. A batten, in particular in order to be used as stiffening in a sail, such as that of a sailsurfing board, a yacht or the like, said batten consisting of

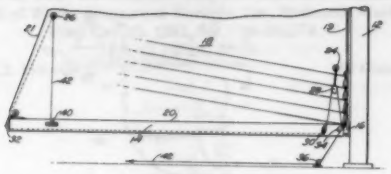
a profile in which, as seen on a transverse sectional view of the batten, a number of cavities have been arranged next to one another in order to each hold a close fitting elongated insert, the cross section of the cavity and insert being adapted to each other in such a way that the insert in the cavity is only movable in a longitudinal direction.

4,487,147

CONTINUOUS REEFING SYSTEM

John G. Hoyt, 49 America's Cup Ave., Newport, R.I. 02840

Filed Aug. 31, 1983, Ser. No. 528,139
Int. Cl.³ B63H 9/10
U.S. Cl. 114—104 3 Claims



1. A sail having a foot, tack and leech detachably secured to a mast and boom:

(a) a leech cringle spaced away from the clew of the sail,

(b) a luff cringle spaced away from the tack of the sail,

(c) a luff block secured to the luff cringle,

(d) a turning block secured to the boom near the gooseneck,

(e) a continuous reefing line attached to the free end of the boom said reefing line leading through the leech cringle, thence parallel to the longitudinal extent of the boom, through the luff block and exiting from the turning block.

4,487,148

SAILBOAT

Kazuhiro Umeda, Tokyo, Japan, assignor to U.M. Corporation, Tokyo, Japan

Filed Sep. 28, 1982, Ser. No. 426,049
Claims priority, application Japan, Sep. 14, 1982, 57-138381
Int. Cl.³ B63H 9/04
U.S. Cl. 114—106 4 Claims

1. A sailboat comprising:

(a) rotatable mast having a pivot mast for holding the front part of a sail, and for winding said sail therearound and a slat member broadening backward from a leading edge to have a section corresponding to a fore portion of a wing section working together with said pivot mast and arranged along said pivot mast;

(b) base for rotatably supporting said pivot mast and said slat member, said slat member being detachably mounted on said base; and

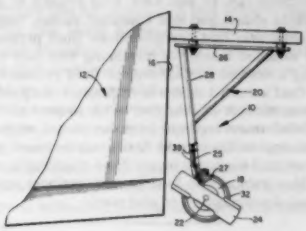
(c) means for rotating said base around the axis of said pivot mast, so that said mast can be directed to a direction of maximum lift and for fixing said base after the rotation at a desired position.

4,487,149

STEERING PACKAGE FOR VESSELS

Nathan Morris, 414 Kentmorr Rd., Stevensville, Md. 21666

Continuation of Ser. No. 437,530, Oct. 29, 1982, abandoned.
This application Apr. 10, 1984, Ser. No. 598,542
Int. Cl.³ B63H 25/42
U.S. Cl. 114—144 E 7 Claims



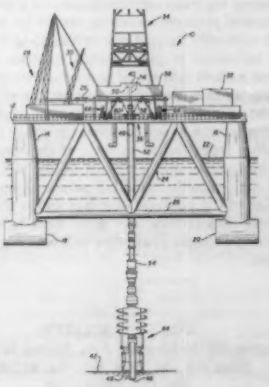
7. In combination with a boat having an on-board AC generator and a swim platform extending rearwardly from the stern of the boat, an auxiliary steering thruster assembly comprising a submergible AC motor with an output shaft having a reversible-thrust screw attached thereto, bracket means suspended directly from the swim platform and having means for holding the motor submerged at a fixed position at which the motor does not substantially increase the drag of the boat, and with the output shaft of the motor extending transversely of the boat, and control means on the boat for reversibly energizing said motor from AC power supplied by said AC generator.

4,487,150

RISER RECOIL PREVENTER SYSTEM

Forrest E. Shanks, DeSoto, Tex., assignor to SEDCO, Inc., Dallas, Tex.

Continuation of Ser. No. 406,485, Aug. 9, 1982, abandoned, which is a continuation of Ser. No. 901,520, May 1, 1978, Pat. No. 4,351,261. This application Aug. 25, 1983, Ser. No. 526,503
Int. Cl.³ B63B 21/52
U.S. Cl. 114—264 8 Claims



1. A method for supporting a marine riser from a floating platform wherein said riser extends from said platform to wellhead means on the seafloor and said riser is adapted to be connected and disconnected with respect to said wellhead means, said method comprising:

providing tensioner means on said platform including pressure fluid actuated means operably interconnected be-

tween said riser and said platform for supporting said riser with respect to said platform;

providing means providing a first predetermined fluid pressure for causing said fluid actuated means to exert a predetermined tension force on said riser while said riser is connected to said wellhead means and to accommodate heaving of said platform relative to said riser;

providing means for generating a signal of the occurrence of a disconnection of said riser with respect to one of said wellhead means and said tensioner means, respectively;

maintaining said first predetermined fluid pressure on said fluid actuated means for tensioning said riser means;

applying a second predetermined fluid pressure acting on said fluid actuated means in response to a signal indicating a disconnection of said riser with respect to one of said wellhead means and said tensioner means, respectively, to act in opposition to said first predetermined pressure to prevent said tensioner means from recoiling in response to a sudden reduction in load on said tensioner means caused by said disconnection of said riser.

4,487,151

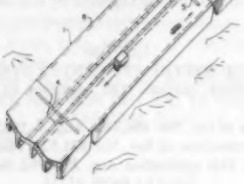
FLOATING HIGHWAY

Salvatore Deiana, 202-1390 Nanaimo St., Vancouver, B.C., Canada V5L 4T6

Filed May 14, 1982, Ser. No. 378,174

Int. Cl.³ B63B *35/34;* **E01D** *15/14*

U.S. Cl. 114—266 **13 Claims**



1. A floating highway unit comprised of a generally rectangular horizontal pontoon including means for floatation of the pontoon, a centrally located horizontal tongue which is progressively narrower in plan toward its nose extending outwardly from a short side of the pontoon, the top surface of the tongue being an extension of the top surface of the pontoon, a recess in the opposite side of the pontoon having a shape for enclosing the tongue which matches the shape of the tongue, a slot extending from the to surface of the tongue across the width of the tongue, and a pair of in-line slots from the top surface of the pontoon extending across at least part of said opposite side of the pontoon into said recess on opposite sides of the recess respectively, the latter slots being coextensive with the slot in a tongue of another unit which may be enclosed in the recess.

4,487,152

BOAT STABILIZER

Wilfred Larson, 41244 Medway Ave., Quartz Hill, Calif. 93534

Filed Jun. 24, 1974, Ser. No. 482,401

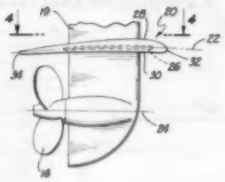
Int. Cl.³ B63B *1/24*

U.S. Cl. 114—274 **8 Claims**

1. A stabilizer capable of being fitted over a cavitation plate located on a motor post of a boat motor so as to extend outwardly around said motor post, said stabilizer comprising:

a foil member having a generally delta wing shape and including a nose portion located in front of said post, leading edges extending outwardly from opposite sides of said nose portion towards the rear of said foil member, ends located at the extremities of said leading edges remote from said nose portion and a trailing edge extending between said ends to the rear of said post,

said foil member being shaped so as to provide an upwardly directed force tending to lift said stern of said boat as said motor is operated and having as a part of said shape a positively cambered upper surface,



said foil member also having a groove extending between its upper and lower surfaces from said trailing edge and extending towards said nose and a slot extending into said foil member from said groove,

said groove being sufficiently large so as to extend around said post, said groove and said slot being dimensioned so that said foil member is capable of being positioned on said post by being slid around said post into a position such that said anti-cavitation plate is fitted within said groove.

4,487,153

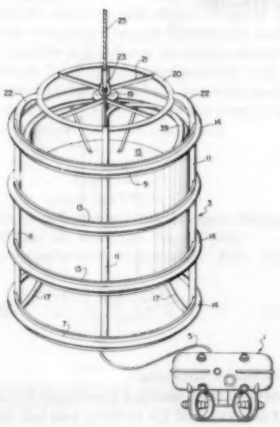
CAGE FOR UNDERSEA TETHERED VEHICLES

Terrence S. McMahon, Sterling, Va., and James P. Keller, Mitchellville, Md., assignors to Eastport International, Inc., Lanham, Md.

Continuation-in-part of Ser. No. 342,190, Jan. 25, 1982, abandoned. This application Sep. 30, 1982, Ser. No. 429,237

Int. Cl.³ B63G *8/00*

U.S. Cl. 114—312 **26 Claims**



1. A cage for tethered vehicles comprising:

drive means for reeling a tether in and out of the cage;

means for constraining the tether in the cage in a substantially circumferential, cylindrical manner in a substantially single wrap, said constraining means being generally of a width slightly wider than the diameter of the tether; and

a rotating bale means between said drive means and said constraining means for receiving said tether and depositing the tether in the constraining means, said bale means being freely rotatable when said tether is no received

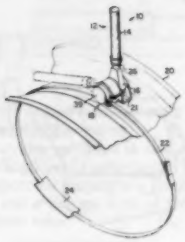
therein such that said tether passing in and out through said bale means causes said bale means to rotate.

4,487,154

PRESSURE-ACTIVATED LOW PRESSURE WARNING DEVICE

James M. Daly, Kirkland, and Gary L. Dusenberry, Redmond, both of Wash., assignors to Rockcor, Inc., Redmond, Wash.

Filed Oct. 15, 1982, Ser. No. 434,574
Int. Cl.³ B60C *23/06*
U.S. Cl. 116—34 B **16 Claims**



1. A device for indicating a pressure drop in a load-bearing, rotating pressurized vessel comprising, in combination:

means mountable inside said vessel for sensing a pressure drop in said vessel below a predetermined level; and

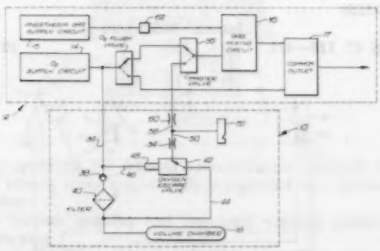
acoustical signal producing means mountable inside said vessel and being enabled to produce an acoustical signal when said pressure drop sensing means senses a pressure drop below the predetermined level, said signal producing means being maintainable in a non-signal producing position by said pressure drop sensing means only when pressure in said vessel is above the predetermined level.

4,487,155

PNEUMATICALLY POWERED OXYGEN PRESSURE LOSS ALARM SYSTEM

Russell Olesen, Huntington, N.Y., assignor to Puritan-Bennett Corporation, Kansas City, Mo.

Filed Aug. 3, 1982, Ser. No. 404,698
Int. Cl.³ G01L *19/12*
U.S. Cl. 116—70 **4 Claims**



1. A pneumatically operated oxygen pressure loss alarm system for use in conjunction with a gas anesthesia machine having an oxygen supply circuit, said system comprising:

a chamber in which a pressurized volume of oxygen can be maintained;

a first oxygen line for connecting said chamber to a pressurized oxygen source;

one-way check valve means for preventing a back-flow of oxygen from said chamber through said first oxygen line;

oxygen escape valve means connected to said chamber and switchable from a closed to an open position in response to a drop in oxygen supply circuit pressure below a predetermined level;

a second oxygen line for connecting said oxygen escape valve means to the oxygen supply circuit to permit said oxygen escape valve means to monitor oxygen pressure within the oxygen supply circuit;

alarm means responsive to a flow of gas;

a third oxygen line for connecting said oxygen escape valve means to said alarm means such that oxygen can flow from said chamber through said third oxygen line, to actuate said alarm means when said oxygen escape valve means is in an open position; and

master valve means operable to disconnect the gas anesthesia machine from its oxygen supply circuit, and to simultaneously connect the alarm means in fluid communication with residual gases in the gas anesthesia machine, whereby the residual gases are vented through said alarm means to provide an indication that the anesthesia machine has been shut off.

4,487,156

BOOKMARK

Barry J. Frost, Clematis Cottage, Boreham La., Boreham St., Nr. Hailsham, E. Sussex., England

Filed Mar. 25, 1982, Ser. No. 361,991
Claims priority, application United Kingdom, Mar. 25, 1981, 8109273; Jun. 2, 1981, 8116811
Int. Cl.³ B42D *9/00*
U.S. Cl. 116—239 **5 Claims**

1. A bookmark for use in combination with a book having a cover and a back, comprising,

(a) an anchoring member for securing the bookmark to said cover of said book,

(b) a first arm arranged to extend in use from the anchoring member generally outwardly of said cover of said book,

(c) a second arm having a first end connected to the outward end of the first arm and arranged in use to extend generally inwardly of said cover to said book and terminating at a second end,

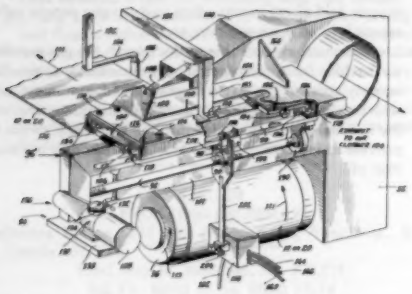
(d) a pointer extending from the second end of the second arm at an acute angle to the second arm so as, in use, to extend generally towards a center, inner portion of said book cover, the arrangement being such that the pointer is capable in use of flexing outwardly of the pages of said book on turning a page to allow passage of the page past the pointer,

(e) wherein the first arm includes a stop positioned so that when the bookmark is used with a hard back book, said stop rests against the outer edge of said book cover to urge the outer end of the first arm outwardly of the pages of said book, thereby to urge the pointer inwardly of the pages of said book.

4,487,157
MACHINE FOR PRODUCING INSULATIVE AND PROTECTIVE COATINGS ON ENDLESS FLEXIBLE METALLIC BELTS OF CONTINUOUS CASTING MACHINES

Norman J. Bergeron, Burlington; Dean A. Boozan, Waterville, and R. William Hazelett, Colchester, all of Vt., assignors to Hazelett Strip-Casting Corporation, Colchester, Vt.

Filed Nov. 7, 1983, Ser. No. 549,652
Int. Cl.³ B05B 3/18
U.S. Cl. 118—59 18 Claims



1. A machine for applying an insulative and protective coating on an endless flexible casting belt comprising:

a plurality of spaced circular cylindrical pulley rolls having substantially parallel axes,

drive means for rotating at least one of said pulley rolls for revolving a casting belt around said pulley rolls,

means for tensioning the belt revolving around said rolls,

means for steering the belt revolving around said rolls,

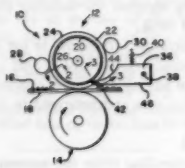
a thermal spray gun, and

means for supporting said gun and for traversing said gun back-and-forth relative to said revolving belt with said gun aimed at said belt from a predetermined stand-off distance.

4,487,158
FUSER APPARATUS

Walter Kayson, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 9, 1983, Ser. No. 502,871
Int. Cl.³ B05C 13/02
U.S. Cl. 118—60 5 Claims



1. Fuser apparatus comprising:

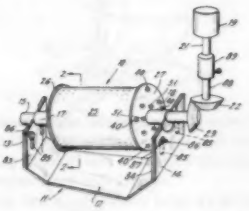
a fuser member movable along a continuous path, said member having a layer with a surface for fusing a toner image carried by a support brought into contact with said surface, said layer including at least one continuous tunnel disposed beneath said surface and a self-sealing slit communicating between said tunnel and said surface; and

a support separating member having an end configured to penetrate said slit and to follow in said tunnel as said fuser member is moved around said path in order to engage and separate the support from said fuser member after contact with the fusing surface thereof.

4,487,159
PLATING BARREL

Hoa T. Dao, Elizabeth, N.J., assignor to OMI International Corporation, Warren, Mich.

Filed Dec. 15, 1982, Ser. No. 448,567
Int. Cl.³ B05C 3/08
U.S. Cl. 118—418 7 Claims

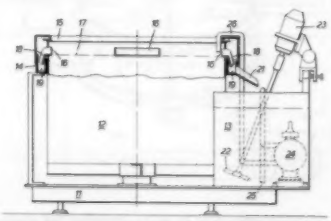


1. A rotatable barrel for use in surface treatment of elements loaded therein, said barrel including first and second plates, a tubular side section having its opposite ends closed by the respective first and second plates, aligned shaft sections extending outwardly in opposite directions from said plates to define a rotational axis for said barrel, each of said plates further including plural positioning means to operatively position tubular side sections of different cross-sections concentric with said axis, said tubular side section being so positioned by one of said plural positioning means of each of said plates, and securing means for drawing said plates toward each other thereby clamping said side section between said plates.

4,487,160
CONSTANT LEVEL SLURRY TANK

Norman W. Frankish, Guiseley, England, assignor to AEPLC, England

Filed Dec. 13, 1983, Ser. No. 560,947
Claims priority, application United Kingdom, Dec. 14, 1982, 8235559
Int. Cl.³ B05C 3/10
U.S. Cl. 118—421 10 Claims



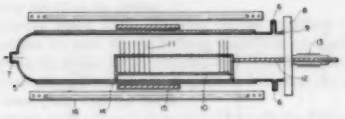
1. A constant level slurry tank system comprising a rotatable drum, a slurry reservoir, a pump arranged to pump slurry from said reservoir to said drum, and an overflow trough surrounding said drum; said drum having at least one opening at a desired slurry level and means to direct said slurry overflowing through said at least one opening into said trough, said trough having an outlet arranged to drain into said reservoir.

4,487,161

SEMICONDUCTOR DEVICE MANUFACTURING UNIT

Yoshihiro Hirata; Kuniaki Miyake, and Hisao Yakushiji, all of Hyogo, Japan, assignors to VLSI Technology Research Association, Kanagawa, Japan

Filed Oct. 28, 1980, Ser. No. 201,115
Claims priority, application Japan, Oct. 30, 1979, 54-140718
Int. Cl.³ C23C *13/08*
U.S. Cl. 118—723 **5 Claims**



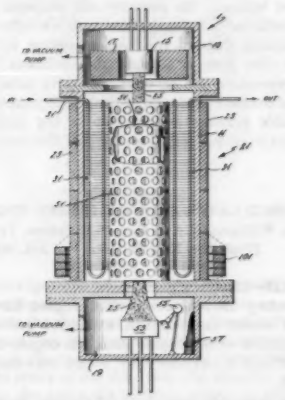
1. A semiconductor device manufacturing unit comprising:
a quartz tube adapted to be sealed;
a wafer holder movably mounted in said quartz tube;
a support bar for moving said wafer holder in said tube when sealed, said support bar serving as a ground electrode; and
an RF electrode and a magnet both of which are disposed outside said quartz tube.

4,487,162

MAGNETOPLASMADYNAMIC APPARATUS FOR THE SEPARATION AND DEPOSITION OF MATERIALS

Gordon L. Cann, P.O. Box 279, Laguna Beach, Calif. 92652

Continuation of Ser. No. 210,240, Nov. 25, 1980, abandoned.
This application Feb. 24, 1983, Ser. No. 469,504
Int. Cl.³ C23C *13/12*
U.S. Cl. 118—723 **37 Claims**



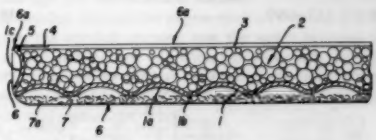
1. An apparatus for refining semiconductor materials by using a plasma spray magnetically accelerated in a vacuum comprising:
(a) a vacuum chamber and associated vacuum pumping apparatus;
(b) a magnetoplasmadynamic Hall effect plasma generator, the plasma generator further comprising:
a cathode
an anode
an accelerating magnet located adjacent that portion of the cathode closest to the anode;
a focusing magnet at least part of which is located beyond the anode with respect to the cathode;
(c) a plasma generator support structure, the support structure supporting the plasma generator within the vacuum chamber;
(d) a means to supply the plasma generator with electric power, the electric power being primarily direct current and the power enabling the plasma generator to create a plasma;
(e) a target surface, the target surface being located beyond the focusing magnet with respect to the cathode and anode;
(f) a means for injecting materials into the plasma in order to create a plasma stream;
(g) an access door enabling access to the inside of the vacuum chamber from the outside, the access door having sealing means, whereby said injected materials are preferentially ionized by the plasma generator, thereby causing impurities in the materials to separate while they are in the plasma stream.

4,487,163

TOILET FOR CATS AND OTHER SMALL ANIMALS

Claude Jobert, and Suzanne Jobert, both of "Liffert", 45320 Courtenay, France

PCT No. PCT/CH82/00043, § 371 Date Nov. 22, 1982, § 102(e) Date Nov. 22, 1982, PCT Pub. No. WO82/03151, PCT Pub. Date Sep. 30, 1982
PCT Filed Mar. 22, 1982, Ser. No. 448,999
Claims priority, application France, Mar. 23, 1981, 81 05760
Int. Cl.³ A01K *23/00*
U.S. Cl. 119—1 **9 Claims**



1. A toilet for cats and other small animals comprising:
(a) reusable litter box having vertical walls and an open top;
(b) a disposable hand crushable and compactible container of foldable liquid impermeable sheet material sized to fit within the open top of the litter box;
(c) a layer of absorbing material disposed on the bottom of the container;
(d) a drain having the shape of a vertically sided opened topped box disposed on said layer of absorbing material and having drainage holes in the bottom thereof communicating with the absorbing material;
(e) a layer of litter material disposed on said drain; and
(f) said disposable container, with the layer of absorbing material, the drain and layer of litter contained therein being removable from the litter box as a unit for disposal by joining and crushing together the edges of said foldable material of the container around the absorbing material, drain and litter to form a sealed pouch.

4,487,164

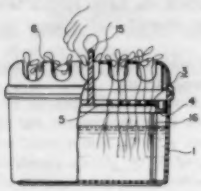
HYDROPONIC PET FEEDING DEVICE

Masayasu Yanagisawa, Tokyo, Japan, assignor to The Greenterior Co., Ltd., Tokyo, Japan

Filed Jun. 30, 1982, Ser. No. 393,926
Claims priority, application Japan, Aug. 18, 1980, 55-116009
Int. Cl.³ A01K *5/00*
U.S. Cl. 119—51.5 **1 Claim**

1. A pet feeding device comprising a container adapted to hold water, a hydroponic device capable of floating on the water, means on said container limiting the descent of said hydroponic device into said container, an apertured cover extending over the container and resting on the upper edges thereof, a vertically disposed standard secured to said hydroponic device and extending upwardly through said apertured

cover, and abutment means on said cover adapted to engage said hydroponic device upon lifting of said hydroponic device



from the water by means of said standard so that the cover will be simultaneously lifted with said hydronponic device.

4,487,165

TUBE LANE MANIPULATOR

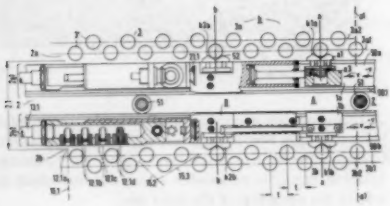
Jakob Weber, Baiersdorf-Hagenau; Josef Forster, Erlangen, and Robert Weber, Uttenreuth, all of Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim, Fed. Rep. of Germany

Filed Jan. 18, 1984, Ser. No. 572,174

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1983, 3301536

Int. Cl.³ F22B *37/52*

U.S. Cl. 122—392 **19 Claims**



1. Tube lane manipulator assembly for the high-pressure blowdown of heat exchangers of steam generators having tubes disposed in rows and spaced apart in a tube grid by a given tube pitch defining interspaces therebetween, tube lanes disposed between the rows of tubes and service openings providing access to the tube lanes, comprising a manipulator, at least one vehicle disposed on said manipulator having a lower base body with a substantially rectangular cross section, a spraying head with nozzles being disposed on said vehicle, said vehicle being insertible into the tube lanes through the service openings and being movable in the tube lanes by remote control in a given feed direction, said spraying head being movable into position for spraying jets directed into the interspaces, at least two extendable and retractable clamping legs disposed in tandem in said feed direction on a side of said vehicle for clamping said vehicle to the tubes in conformity with the tube pitch in a clamping plane on at least one side of a tube lane for positioning said nozzles in respective spraying positions of a spraying position sequence, the spraying direction of said nozzles and the distance thereof from said clamping plane being matched to the tube pitch for directing the spray jets into the interspaces, and at least one guide rail extended along said feed direction within a tube lane forming an abutment for said clamping legs and a guide for said vehicle, said guide rail having a substantially L-shaped cross section with a vertical leg facing away from the row of tubes closest to the tube lane and a horizontal leg defining a space between said legs being limited in width by the row of tubes closest to the tube lane for receiving said lower base body of said vehicle.

4,487,166

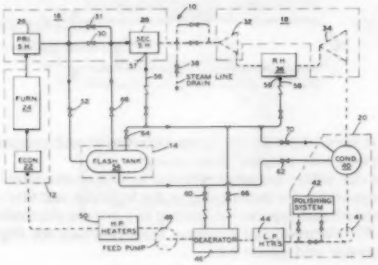
START-UP SYSTEM FOR ONCE-THROUGH BOILERS

Kurt H. Haller, Akron; Carl Lieb, Norton, and Pete G. Todoroff, Akron, all of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Continuation of Ser. No. 271,142, Jun. 8, 1981, abandoned. This application Sep. 12, 1983, Ser. No. 531,093

Int. Cl.³ F22D *7/00*

U.S. Cl. 122—406 ST **1 Claim**



1. In combination with a power plant system having a main once-through fluid flow path connected in series with furnace enclosure tubular means, primary and secondary superheaters, high and low pressure turbine means with a reheater connected therebetween, the improvement comprising utilization of multi-lead ribbed tubing as the tubular means whereby minimum start-up flow is reduced to approximately 15 percent of full load flow, a start-up system including a flash tank, valve means interposed between the primary and secondary superheater and in parallel with the main flow path whereby the transition from operation through the start-up system to flow through the main flow path is accomplished without fluctuation in steam temperature and wherein the valve means provide supercritical pressure upstream of the primary superheater outlet and variable pressure downstream of the secondary superheater inlet over the greater portion of the load range.

4,487,167

OSCILLATING PISTON DIESEL ENGINE

Robert H. Williams, Rte. 2, Box 44, Bandera, Tex. 78003

Filed Jan. 22, 1982, Ser. No. 341,764

Int. Cl.³ F02B *53/04*

U.S. Cl. 123—18 R **2 Claims**

1. A rotary internal combustion engine having the four phases of intake, compression, expansion and exhaust with each revolution of the engine shaft, the engine comprising:

a stator with a cylinder bore sealed between parallel end walls;

a power shaft concentric with the cylinder bore supported in bearings in the end walls;

an eccentric rotor fixed to the power shaft, virtually coextensive with the end walls, its head barely clearing the cylinder, each of the rotor ends fitted with yieldable seals to sweep the end walls;

a transverse wiper blade in a slot across the rotor head, spring biased outward to yieldably sweep the face of the cylinder to form a suction stroke behind it and a compression stroke ahead of it as the rotor travels, to suck air into the cylinder through a port in the lower part of the stator and at the same time to force air ahead of it into a combustion chamber;

an air inlet port centered between 5:00 and 7:00 o'clock, comprising an opening in the stator fitted with one-way inlet valves, to allow air to be sucked into the cylinder but prevent it from being pumped out via the inlet port;

an abutment comprising a rectangular metal base plate

turned upward at one end to form an "L", the base plate rounded at its other end to form a pivot and the pivot cradled in a shallow seat in the cylinder near 2:00 o'clock, the shallow seat allowing the abutment to oscillate vertically inside the cylinder space as its base plate rides on the eccentric rotor;

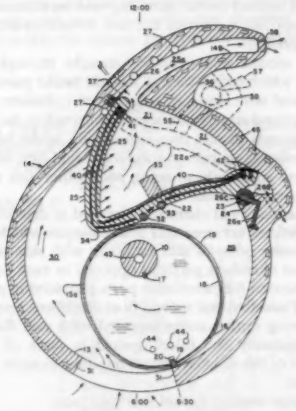
the base plate reaching counter-clockwise from its pivoted end somewhat further than a vertical line through the center of the engine shaft;

the upward extension of the abutment in the shape of an arc with the pivot as its center;

the abutment fitted with one-way valves to allow compressed air to pass through from the cylinder during a compression stroke to be trapped in a combustion chamber inside the elbow of the abutment, between the abutment base plate and the stator;

the abutment spring biased downward toward the rotor by a spring outside at least one end wall, the spring bearing against an arm which is fixed to a hub on the end of the abutment pivot extending through the end wall, the pivot to transmit the downward thrust of the spring to the abutment with which it is integral;

the abutment fitted with at least one end seal in a slot, on each end, to sweep the end walls to prevent combustion gases from leaking out of the combustion chamber between the end walls and the ends of the abutment;



a combustion-expansion chamber of variable cubic volume, roughly triangular in shape as viewed from an end, contained inside the abutment elbow, the chamber formed by the abutment base plate as one side, the arcuate abutment extension as the second side and the compression head area of the stator as the third side, the chamber closed on its ends by the end walls between which the abutment is caused to slidably oscillate, the compression head so positioned in the engine casting that when the abutment is at its zenith a combustion chamber of predetermined minimum cubic volume is formed;

an arcuate channel cast in the stator on a radius from the pivot, the channel so positioned and of such dimensions as to receive the abutment extension in a close-fitting cavity on the upward swing of the abutment, to allow the abutment base plate to squeeze a charge of air upward against the compression head;

a fuel injector projecting into the combustion chamber to spray a charge of fuel into the compressed air in the chamber as the rotor head approaches top center, and a glow plug projecting into the same chamber in close proximity to the fuel injector to aid in igniting the fuel charge, the gases of combustion to bear downward on the base plate to cause the eccentric rotor to rotate;

roller bearings on the under side of the abutment base plate positioned to bear on the rotor through the expansion stroke to minimize friction in transferring power from the abutment to the rotor;

primary exhaust means comprising a horizontal slot through the stator near the base of the arcuate channel, on a level with the under side of the compression head, the slot covered by the arcuate extension of the abutment during the compression and expansion strokes but uncovered by that abutment extension as it drops out of its channel at the end of the expansion stroke, the slot allowing compressed air forced into the expansion chamber ahead of the rotor to sweep spent gases out of the engine;

auxiliary exhaust means comprising a slot in the outer end of the arcuate channel which slot is shut off during the compression and expansion strokes by the abutment extension but is uncovered at the end of the expansion stroke when the abutment extension drops out of its channel, allowing the spent gases to flow from the expansion chamber up through the channel and out via the slot;

the forward face of the rotor somewhat flattened for a span of sixty to ninety degrees, the flattened span beginning a few degrees ahead of the wiper blade, the flattening designed to let the rotor pump virtually all the air out of the cylinder into the combustion chamber before the curvature of the rotor lifts the abutment too far into the stator space to allow the abutment inlet valves to function;

means for cooling and at the same time lubricating the rotor, its bearings and the rotor end seals, the means comprising an oil conduit through the engine shaft on a first end of the engine, the conduit opening into the space between the rotor web and the first end wall, bores through the rotor web to the opposite side, an opening on that side into the engine shaft and a conduit through the shaft out through the second end of the engine.

4,487,168

MACHINE HAVING OSCILLATING CHAMBERS AND PISTONS

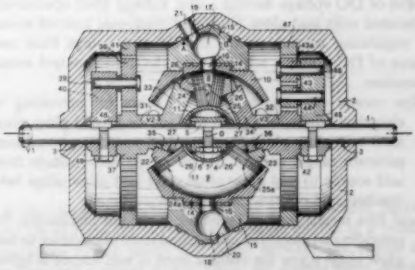
Roger Bajulaz, 825 Las Palmas Dr. - Hope Ranch, Santa Barbara, Calif. 93110

Filed Jul. 29, 1982, Ser. No. 403,130

Claims priority, application Switzerland, Mar. 25, 1982, 1834/82

Int. Cl.³ F01C *1/02*; F04C *1/02*; F02B *55/14*

U.S. Cl. 123—18 R **27 Claims**



1. Machine having oscillating chambers and pistons, comprising a control member having an axis, a central pivot having an axis and being fixed against rotation relative to said control member but oscillable relative to said control member about an axis perpendicular to and intersecting the axis of said control member; the path of oscillation of said central pivot axis crossing on opposite sides of a plane perpendicular to said control member axis and passing through said intersection; at least one eccentric comprising a rotary bearing having an axis which is

disposed at an acute angle to the axis of the control member and passes through said intersection; at least one piston turning on said rotary bearing and pivoted concentrically to the axis of said central pivot, said at least one piston having at least one surface moving inside at least one chamber, said at least one chamber being fixed against movement relative to said central pivot; and drive means to cause relative rotation between the eccentric and the control member.

4,487,169

ELECTRONIC CONTROL UNIT FOR INTERNAL COMBUSTION ENGINES

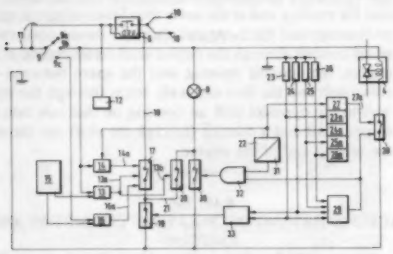
Paul J. Slezak, Pierrefonds; Marcel J. P. E. Durand, and Robert P. Dunlop, both of Montreal, all of Canada, assignors to KHD-Canada, Inc., Montreal, Canada

Filed Sep. 14, 1982, Ser. No. 418,028

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1982, 3210504

Int. Cl.³ F02N *17/00*

U.S. Cl. 123—41.33 **29 Claims**



1. An internal combustion engine having a plurality of reciprocating pistons disposed in separate cylinders therein, a plurality of glow plugs each having a variable temperature and a characteristic temperature curve representing an operational temperature range of said glow plugs wherein each of said glow plugs is operatively associated with one of said heads, a source of DC voltage having a first voltage level operatively associated with said glow plugs and electronic control means for regulating heating power to said glow plugs from said source of DC voltage, wherein said electronic control means comprises:

first means including a first mechanism for providing an electrical connection from said source to said glow plugs until said glow plugs have reached said operational temperature range, and for disconnecting said voltage from said source to said glow plugs after said glow plugs have reached said operational temperature range;

said first means further including a second mechanism for providing an electrical connection from said source to said glow plugs when the voltage level of said source is below a first predetermined reference level and the temperature of said glow plugs is below said operational temperature range; and

second means for alternately connecting and disconnecting said source of D.C. voltage to said glow plugs after having reached said predetermined reference level, and after the temperature of said glow plugs is above said operational temperature range, at a duty cycle rate ranging from 0 to 100 percent, said duty cycle rate depending on said first voltage level of said source.

4,487,170

CARBURETOR DEVICE FOR V-TYPE INTERNAL COMBUSTION ENGINES

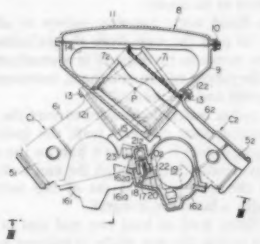
Yoshiyuki Kawaguchi, Niiza, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 22, 1982, Ser. No. 421,332

Claims priority, application Japan, Dec. 16, 1981, 56-203184

Int. Cl.³ F02B *75/20*

U.S. Cl. 123—59 PC **8 Claims**



1. A carburetor device for V-type internal combustion engines, having first and second cylinders disposed in a V-shape and first and second carburetors disposed between said cylinders for supplying a gaseous mixture to said cylinders separately, comprising:

first and second intake barrels straight throughout their length, which define therein straight intake passages communicated with respective associated cylinders;

first and second straight air horns connected to the upstream opening ends of said first and second intake barrels and being colinear thereto, respectively, said first and second air horns adjacently crossing each other and extending into a common intake box;

first and second float chambers disposed in that portion of a space defined between said intake barrels which is below the crossing point of said air horns with side surfaces of said float chambers partially opposed to each other;

first and second fuel admission ports provided in peripheral walls of said first and second float chambers, respectively, and having outlets communicated with said float chambers separately and inlets opened in parts of said side surfaces of the float chambers opposed to each other;

a fuel tank;

one fuel pipe leading to said fuel tank; and

a connecting means for joining said inlets of the first and second fuel admission ports to said fuel pipe.

4,487,171

INTERNAL COMBUSTION ENGINE HAVING DIVERTER VALVE AND SEPARATE PASSAGE FOR PURGING ENGINE

George W. Vosper, 149 Earl St., Kingston, Ontario, Canada K7L 2H3

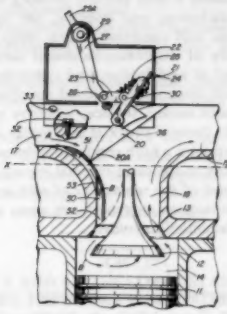
Filed May 23, 1983, Ser. No. 497,203

Int. Cl.³ F01L *1/28*

U.S. Cl. 123—79 R **2 Claims**

1. In a fuel injected, internal combustion engine of the type having a single poppet valve for controlling the flow of air to the combustion chamber and exit of exhaust gases therefrom, an inlet passage for the supply of air under pressure; an outlet passage for exit of exhaust gases, said outlet passage communicating with said inlet passage as a continuation thereof; a further passage terminating at one end in said combustion chamber and at the other end at the junction of said inlet and outlet passages, said single poppet valve being arranged and operated to control the flow of gases through said further passage into and out of said combustion chamber in timed relation to rotation of the engine's crankshaft, all of said passages being circular in cross-sectional shape; a diverter valve selectively mov-

able in timed relation with opening and closing of the poppet valve so as in one position to direct flow of pressurized air through the inlet passage into the combustion chamber and later, in another position, the flow of combustion gases from the combustion chamber through the outlet passage; and means controlling movement of said diverter valve from each



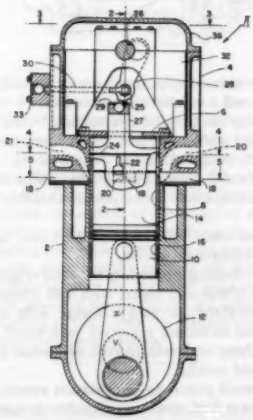
of one position to another, the improvement comprising a secondary air passage to said combustion chamber in parallel flow relation with said inlet passage and arranged such that air flows therethrough into the combustion chamber when the diverter valve is in the exhaust position and the poppet valve is open.

4,487,172

SLEEVE VALVE INTERNAL COMBUSTION ENGINE

James R. Suhre, P.O. Box 236, Edwardsville, Ill. 62025

Filed Apr. 12, 1983, Ser. No. 468,708
Int. Cl.³ F01L 7/04
U.S. Cl. 123—81 C **7 Claims**



1. A four cycle, single sleeve internal combustion engine comprising:

a block having a bore and a plurality of exhaust and intake passages that open into the bore;

a single sleeve located within said bore to form a cylinder, said sleeve having apertures and being mounted within said bore for rotation within and axial movement along said bore to selectively bring said apertures into and out of alignment with said exhaust and intake passages;

a piston slidably mounted within said sleeve; a crankshaft mounted for rotation about an axis that is fixed in position with respect to the block; a connecting rod connecting said piston and crankshaft whereby said piston moves axially along said sleeve as crankshaft revolves, a head fixed to said block and closing the end of said sleeve remote from said crankshaft;

a sleeve valve actuating mechanism comprising of:

a valve crankshaft mounted above the head for rotation parallel to the said crankshaft and driven at half speed;

an extension of the said sleeve extending through the head;

a valve connecting rod connecting said valve crankshaft to said sleeve extension;

a radius rod lying essentially in the plane of motion of said valve connecting rod with one end connected to the said valve connecting rod approximately two thirds of the way down it, and the other end connected to said block such that the said radius rod is essentially horizontal when the sleeve is at mid-axial stroke;

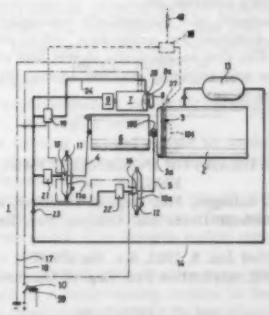
the result being that as the valve crankshaft turns at half speed, the sleeve moves in a quasi-eliptical path, said sleeve apertures are moved approximately twice as far in the axial direction as in the circumferential direction as said apertures are aligned with said intake and exhaust passages during engine cycle.

4,487,173

APPARATUS FOR STARTING AN INTERNAL COMBUSTION ENGINE

Paul Maucher, Sasbach, and Hugo-Werner Geschka, Düsseldorf, both of Fed. Rep. of Germany, assignors to Luk Lamellen und Kupplungsbau GmbH, Bühl, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 101,547, Dec. 7, 1979, Pat. No. 4,347,813. This application Sep. 2, 1982, Ser. No. 414,433
Claims priority, application Fed. Rep. of Germany, Dec. 18, 1978, 2853130
The portion of the term of this patent subsequent to Sep. 7, 1999, has been disclaimed.
Int. Cl.³ F02N 5/04
U.S. Cl. 123—179 J **40 Claims**



1. Apparatus for starting an engine by a flywheel, particularly for starting the internal combustion engine of a vehicle, comprising clutch means interposed between the engine and the flywheel; a starter wheel, one of the wheels being movable into and from engagement with the other of the wheels in disengaged condition of the clutch means to accelerate the flywheel to a predetermined speed at which the flywheel can start the engine in response to engagement of the clutch means; fluid-operated actuating means arranged to automatically engage the clutch means and to thus start the engine when the flywheel is accelerated to the predetermined speed, said actuating means including pump means; and single electric motor means for driving the starter wheel as well as the pump means.

4,487,174
ENGINE STARTER

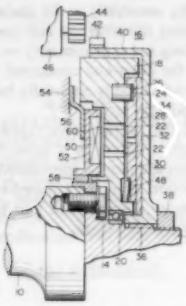
Shuuzo Isozumi, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 1, 1983, Ser. No. 547,773

Claims priority, application Japan, Nov. 6, 1982, 57-168905[U]

Int. Cl.³ F02N *17/00*

U.S. Cl. 123—179 J **4 Claims**



1. An engine starter for use with an internal combustion engine having a rotary crank shaft, comprising:

a flywheel relatively rotatably mounted on the crank shaft;

a disc plate fixedly mounted on the crank shaft for rotation therewith;

a substantially disc-shaped clutch plate having a magnetic armature and friction plate thereon and disposed between said disc plate and said flywheel for transmitting torque therebetween, said clutch plate being mounted on said flywheel and axially movable relative thereto between an engaging position in which the friction plate frictionally contacts the disc plate and a disengaged position in which the friction plate is spaced from the disc plate;

a biasing means disposed between said flywheel and said clutch plate for always biasing said clutch plate toward said engaging position; and

an electromagnetic coil magnetically associated with said magnetic armature for generating, when energized, a magnetic flux that magnetically moves said clutch plate away from said engaging position against the action of said biasing means.

4,487,175
CYLINDER HEAD FOR INTERNAL COMBUSTION ENGINE

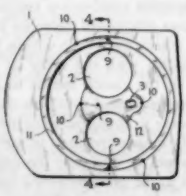
Robert Krczal, Solingen, Fed. Rep. of Germany, assignor to Klöckner-Humboldt-Deutz AG, Cologne, Fed. Rep. of Germany

Filed Jan. 8, 1982, Ser. No. 338,057

Claims priority, application Fed. Rep. of Germany, Jan. 13, 1981, 3100755

Int. Cl.³ F02F *1/26*

U.S. Cl. 123—193 H **7 Claims**



1. A cylinder head of aluminum alloy for an internal combustion engine, comprising a head member having a bottom wall forming an internal combustion chamber wall and having a pair of spaced ports for gas exchange valves and an opening for the reception of one of an injection nozzle and an ignition aid, said bottom wall having a sealing surface along its lower periphery which delimits said combustion chamber wall, and said head member including a wall portion defining a bridge between said ports including said opening, the improvement wherein said bottom wall comprises a first insert of material consisting essentially of dispersion-hardened sintered aluminum solely disposed at said bridge, and comprises a second insert of material of dispersion-hardened sintered aluminum solely disposed at said sealing surface, whereby resistance of said head member to thermal shock at said bridge is increased, said sealing surface retains a high residual hardness at elevated temperatures, and due to the same thermal expansion coefficient of said inserts and of the remainder of said head member any tendency of separation therebetween upon increases in thermal loads is substantially avoided.

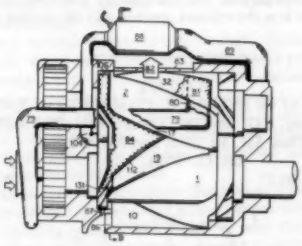
4,487,176
ROTARY POSITIVE DISPLACEMENT MOTOR

Patrick A. Kosheleff, General Delivery, Big Pine, Calif. 93513

Filed Jul. 29, 1982, Ser. No. 402,975

Int. Cl.³ F02G *3/00*

U.S. Cl. 123—204 **4 Claims**



1. A rotary positive displacement motor including a housing, a piston rotor, and a barrier rotor, in which

a. said housing has parallel intersecting bores, a high pressure gas inlet port at one end of said bores, an exhaust port substantially at the other end of said bores,

b. said piston rotor carries a compound piston which, during rotation, sweeps out a compound chamber in one said bore,

c. said barrier rotor is located in the other said bore and includes a compound recess,

d. said rotors rotating oppositely in timed relation for meshing of said compound piston with said compound recess,

e. said piston rotor carrying a flange with a notch, said barrier rotor including a groove with small pistons, said flange meshing with said groove, said small pistons meshing with said notch,

f. each said small piston during rotation sweeping out from said groove a high pressure chamber in communication with said inlet port for filling said high pressure chamber with said high pressure gas,

g. said high pressure chamber after further rotation entering into communication with said compound recess swept by said compound piston, thereby beginning work-producing expansion,

h. said compound recess, during said unmeshing from said compound piston, being connected to said compound chamber swept by said compound piston, in order to continue work-producing expansion,

i. said compound piston having a greater diameter than said flange, so that said compound chamber is larger than said high pressure chamber, for larger expansion ratio,

any piston, when in mesh, dividing its meshing recess into an expansion volume behind the rotation of said piston, and an exhaust volume ahead of the said rotation of said piston,

k. said piston rotor carrying an intermediate piston between said flange and said compound piston, said barrier rotor including an intermediate recess connecting said groove to said compound recess,

l. said intermediate recess where it connects to said groove being substantially no deeper than the height of said flange,

m. said flange covering said exhaust volume of said intermediate recess to block leakage flow from said high pressure chamber,

n. said compound piston after the end of said expansion sweeping and exhaust chamber which was formerly a compound chamber, said compound piston achieving mechanical purging of the exhaust gas in said exhaust chamber through said exhaust port.

4,487,177

APPARATUS AND METHOD FOR STARTING A DIESEL ENGINE USING PLASMA IGNITION PLUGS

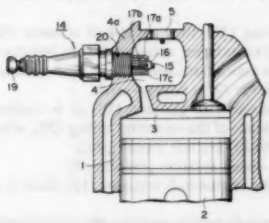
Yasuki Ishikawa, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Kanagawa, Japan

Filed Jan. 26, 1983, Ser. No. 461,125

Claims priority, application Japan, Mar. 23, 1982, 57-44707

Int. Cl.³ F02B *9/08;* **F02P** *23/00, 1/00*

U.S. Cl. 123—260 **16 Claims**



1. Apparatus for initiating operation of a diesel engine having multiple diesel cylinders at least one of which has an exhaust temperature characteristic that tends to differ during starting from the exhaust temperature characteristics of another of the cylinders, comprising means for supplying a fuel air mixture to each cylinder, a plasma ignition plug for each cylinder to initiate conbustion of the supplied mixture in the associated cylinder, and means for applying discharge energy to the plugs during starting so that different amounts of energy are applied to the plugs tending to have the different exhaust temperature characteristics so that the exhaust temperature and combustion states of the cylinders are approximately the same during starting to overcome the tendency of the differing exhaust temperature characteristics.

4,487,178

AIR-COMPRESSING, DIRECT-INJECTION INTERNAL COMBUSTION ENGINE

Alfred Neitz, Wendelstein; Hans Pickel, and Nunzio D'Alfonso, both of Nuremburg, all of Fed. Rep. of Germany, assignors to M.A.N. Maschinenfabrik Augsburg-Nürnberg Aktiengesellschaft, Nürnberg, Fed. Rep. of Germany

Filed Nov. 26, 1982, Ser. No. 444,792

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1981, 3147015

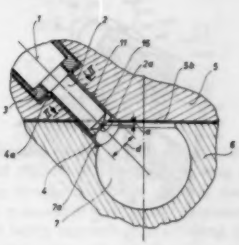
Int. Cl.³ F02B *23/06*

U.S. Cl. 123—276 **7 Claims**

1. An air-compressing, direct-injection internal combustion engine which has at least one piston/cylinder unit including:

a piston having a crown region and a crown surface which faces the underside of a head of an associated cylinder, said piston being provided in said crown region thereof with a combustion chamber having the shape of a solid of revolution, with air for combustion being introduced into said combustion chamber and having imparted thereto a rotary motion about the longitudinal axis of said combustion chamber;

a fuel injection nozzle having a shank being arranged eccentrically in said cylinder head in the vicinity of the edge of the opening of said combustion chamber for injecting a single jet of fuel into said combustion chamber in the direction toward said rotating air for combustion in such a



way that a film of fuel can form on the wall of said combustion chamber; said injection nozzle having a discharge orifice, with said injection nozzle being disposed in said cylinder head in such a way that in the top dead center position of said piston, said discharge orifice is located below said piston crown surface and projects into said combustion chamber; and

a sleeve is provided which is disposed about said shank of said injection nozzle with clearance, is provided with a longitudinal slot, is open at its ends, and projects beyond said discharge orifice in the direction toward said combustion chamber.

4,487,179

INTERNAL COMBUSTION ENGINE

Leroy E. Hercher, 311 Meridian Ave., San Jose, Calif. 95126

Filed Jan. 3, 1983, Ser. No. 436,835

Int. Cl.³ F02F *3/24*

U.S. Cl. 123—307 **12 Claims**

1. An internal combustion engine for burning a combustible fluid mixture, said engine including:

means for forming a cylinder with an intake and exhaust port; a piston in the cylinder having a piston head with a circumferential edge,

said piston being formed with a plurality of passageways inside the piston head extending from inlets around the circumferential edge towards outlets around the center of the piston head;

a rotatable crankshaft connected to move the piston back and forth in a reciprocating motion to form a variable volume combustible chamber in the cylinder; and

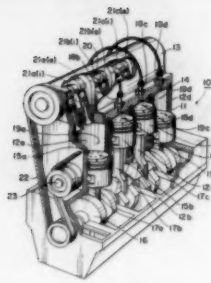
a rotatable camshaft having valve means for selectively opening and closing the intake and exhaust ports,

said camshaft being operably connected to the crankshaft to develop a power stroke for the piston during a four stroke cycle of operation, and

said valve means operating to open the exhaust port before the end of the power stroke to divide the power stroke into a first phase and a second phase,

wherein during the power stroke of the four stroke cycle of operation, the valve means of the rotatable camshaft keep closed the exhaust port during a first phase portion of the power stroke, and opens the exhaust port during a second phase portion of the power stroke to allow the combustible fluid mixture to flow from the combustible

chamber through the inlets to the passageways to form an escaping column of the combustible fluid mixture extending from the center of the piston head from said



outlets towards the exhaust port, said escaping column of combustible fluid mixture developing a reaction force means on the piston head to continue to move the piston during the power stroke.

4,487,180

ENGINE WITH A ROTARY-SPEED CONTROL APPARATUS AND AN EMERGENCY HALT APPARATUS

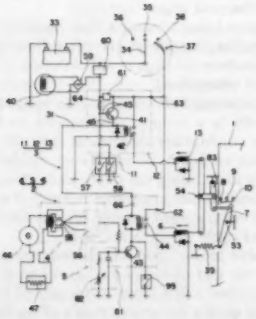
Ryoichi Ito, Sakai; Osamu Murakami, Nara; Masayuki Nakamura, Sakai; Kazuo Higo, Sakai, and Kengi Ueno, Sakai, all of Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed Nov. 21, 1983, Ser. No. 554,152

Claims priority, application Japan, Oct. 22, 1983, 58-175918

Int. Cl.³ F02D *17/04*

U.S. Cl. 123—333 **7 Claims**



1. In an engine with a rotary-speed control apparatus and an emergency halt apparatus, such that:

the engine **(1)** is provided with a rotary-speed control apparatus **(2)** and an emergency halt apparatus **(3)**;

the rotary-speed control apparatus **(2)** comprises:

a load detection circuit **(4)**,

a rotary-speed control circuit **(5)** and

a rotary-speed switchover actuator **(6)**,

which are connected one after another in this sequential order,

and

functions so as to maneuver an accelerator lever **(7)**, by means of the rotary-speed switchover apparatus **(6)**:

into a high-speed rotation position **(8)** when the engine **(1)** is in a state of loaded operation which state is detected by the load detection apparatus **(4)** and is communicated to the rotary-speed control circuit **(5)**,

and

into a low-speed rotation position **(9)** when the engine **(1)** is in a state of no-load operation, which state is detected and communicated in the same manner as mentioned above; and

the emergency halt apparatus **(3)** comprises:

an abnormality detection apparatus **(11)**,

an emergent halt control circuit **(12)** and

an engine-halt actuator **(13)**,

which are connected one another in this sequential order,

and

functions so as to halt operation of the engine **(1)** by means of the engine-halt actuator **(13)**, in response to occurence of any abnormality in the engine **(1)**, which occurence is detected by the abnormality detection apparatus **(11)** and communiccated to the emergent halt control circuit **(12)**;

THE IMPROVEMENT comprising the engine with a rotary-speed control and an emergency halt apparatus, COMPRISING THAT:

a restoring spring **(39)**, the engine-halt actuator **(13)** and the rotary-speed switchover actuator **(6)** are interlockedly connected to the accelerator lever **(7)**, in such a manner that the accelerator lever **(7)** is maneuvered:

into an engine-halting position **(10)** as is resiliently urged there by means of the restoring spring **(39)**, when both the actuators **(6,13)** are left deenergized,

into the low-speed rotation position **(9)**,

when only the engine-halt actuator **(13)** alone is energized, and

into the high-speed rotation position **(8)**, when both the actuators **(6,13)** are energized together;

the rotary-speed control circuit **(5)** of the rotary-speed control apparatus **(2)** is connected to an eletric power source **(33)** via:

an electric wire **(31** or **32)** and the emergent halt control circuit **(12)** of the emergency halt apparatus **(3)**, in such a manner that:

the electric power supply is effected from the power source **(33)** to the rotary-speed control circuit **(5)** through the emergent halt control circuit **(12)**,

when the emergent halt control circuit **(12)** is in the normal actuation state,

thus to retain the rotary-speed control circuit **(5)** in the actuation state,

the accelerator lever **(7)** is maneuvered by means of the restoring spring **(39)**, into the engine-halting position **(10)**,

thus to halt the engine **(1)**,

when the emergent halt control circuit **(5)** is not in the normal actuation state,

on account of then blockingly halting the electric supply from the emergent halt control circuit **(12)**:

on the hant to the engine-halt actuator **(13)** and

on the other hand to the rotary-speed control circuit **(5)** and therefore also to the rotary-speed switchover actuator **(6)**; and

a control input line **(64)** of the emergent halt control circuit **(12)** of the emergency halt apparatus **(3)** is connected to the power source **(33)** parallelly via:

an ON position **(38)** and

a starter position **(37)** of a main switch **(34)**,

in such a manner that the accelerator lever (7) is automatically into the low-speed rotation position (9),

when the main switch (34) is maneuvered into the starter position (37) to thus provide the engine-starting state,

on account that:

the emergent halt control circuit (12) then gets electric supply from the control input line (64) and thus energizingly actuates the engine-halt actuator (13), and

the rotary-speed control circuit (5) then gets the electric supply through the emergent halt control circuit (12) but, in view of no load-signal being emitted from the load detection apparatus (4), blocks energization of and therefore halts the rotary-speed switchover actuator (6).

4,487,181

FUEL SUPPLY SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

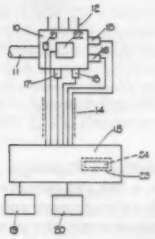
John H. Moore, Kingscote, and Andrew P. Ives, Shilton, both of England, assignors to Lucas Industries public limited company, Birmingham, England

Filed Mar. 14, 1983, Ser. No. 475,388

Claims priority, application United Kingdom, Apr. 3, 1982, 8209950

Int. Cl.³ F02D *31/00*

U.S. Cl. 123—357 **7 Claims**



1. A fuel supply system for supplying fuel to an internal combustion engine, in particular a compression ignition engine, comprising a mechanically actuated high pressure pump, at least one electrically operated control for determining an operating parameter of the pump, an electronic control system for controlling the flow of electric current to said control, thereby to influence said operating parameter, a test record associated with the pump, said test record containing test data of that particular pump which is utilized to supply test data to the control system, said control system being arranged to utilize said test data of said pump in determining the exact operating parameter associated with the exact pump being used whereby test data for an individual pump is made available for use by said control system so that an exact amount of fuel can be supplied to the engine at a precise timing of delivery.

4,487,182

CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINES

Gerhard Stumpp, Stuttgart, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

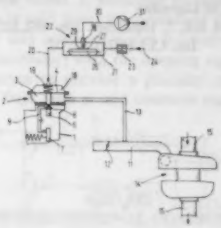
Filed Jan. 24, 1983, Ser. No. 460,700

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1982, 3215736

Int. Cl.³ F02D *1/14*

U.S. Cl. 123—383 **4 Claims**

1. A control device for supercharged diesel internal combustion engines, said control device comprising a wall movable against a force of a return means by an intake air of said engine and thereby arranged to influence a full-load position of a supply volume adjustment element of a fuel metering device, said movable wall further arranged to separate a pressure chamber connected by a line to an intake tube of said engine from a back-pressure chamber, said back-pressure chamber being connected to a reference absolute pressure which is constant under all working conditions of said device, characterized in that said reference absolute pressure is generated in a line by a vacuum source which aspirates atmospheric air via



at least two throttle means, at least one of said throttle means having a fixed throttle diameter and at least another of said throttle means having a variable throttle diameter which is controlled by a movable wall of an evacuated chamber, said movable wall being exposed to a resulting pressure of said reference absolute pressure in the line between said two throttle means.

4,487,183

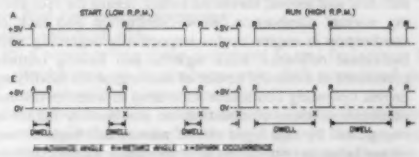
SPEED DEPENDENT IGNITION CONTROLLER AND METHOD

Adelore F. Petrie, Arlington Heights, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 27, 1983, Ser. No. 488,945

Int. Cl.³ F02P *5/04*

U.S. Cl. 123—418 **20 Claims**



1. A speed dependent ignition timing controller for an internal combustion engine comprising:

a sensor coupled to said engine for generating a sensor signal having a pulse width proportional to a difference between a desired ignition advance and retard angle;

an engine speed detector coupled to said sensor for developing first and second threshold signals when said sensor signal is representative of an engine speed less than and greater than a threshold engine speed respectively; and

a speed dependent signal inverter coupled to said sensor and said engine speed detector for providing a dwell control signal by selectively inverting said sensor signal in response to said first and second threshold signals, said dwell control signal adaptable for controlling the initiation of at least one of dwell and spark

whereby said dwell control signal ends at said retard angle when said first threshold signal is present and ends at said advance angle when said second threshold signal is present.

4,487,184

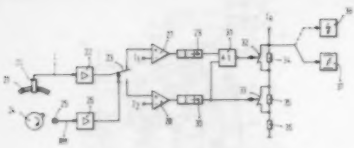
CONTROL OF AN INTERNAL COMBUSTION ENGINE WITH REFERENCE TO A COMBUSTION CHAMEER SENSOR

Bernward Böning; Rainer Bone, both of Vaihingen; Rudolf Nagel, Asperg, and Franz Sellmaier, Schwieberdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jul. 7, 1983, Ser. No. 482,327

Int. Cl.³ F02D *37/02*

U.S. Cl. 123—425 **7 Claims**



1. Corrective monitoring system for an internal combustion engine, comprising:

a first sensor (20) in a combustion chamber of said engine for producing an electrical signal indicative of the extent of combustion in said chamber;

a second sensor responsive to the passage of a reference mark on a rotary part of said engine for producing electrical reference mark signals synchronized with engine shaft revolution;

means for deriving first and second timing gate signals (A,B) from said reference mark signal respectively designating successive time intervals which are fixed in time with reference to said reference mark signal;

first threshold switch means (27) arranged to be connected to the output of said first sensor during the presence of said first timing gate signal (A) for comparing the signal of said first sensor with a first reference signal value;

second threshold switch means (28) arranged to be connected to the output of said first sensor during the presence of said second timing gate signal (B) for comparing the signal of said first sensor to a second reference signal value, and

logic circuit means connected to the respective outputs of said first and second threshold switch means for recognizing normal combustion, slow combustion and lack of combustion in engine cycles respectively beginning with individual reference mark signals, and having outputs connected to a control device of said engine for modifying engine operating conditions according to whether normal combustion, slow combustion or combustion failure is recognized by said logic circuit means, said logic circuit means being so constituted as to recognize a slow combustion condition when said second threshold switch means responds to a signal of said first sensor reaching said second reference signal value and to recognize a failure of combustion when neither said first threshold switch means nor said second threshold switch means response to a rise of said signal of said sensor reaching respectively said first and said second reference signal values.

4,487,185

AIR-FUEL MIXTURE INTAKE APPARATUS FOR INTERNAL COMBUSTION ENGINES

Hiroshi Yokoyama, and Tokuzi Ishida, both of Hamamatsu, Japan, assignors to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed Jan. 19, 1982, Ser. No. 340,714

Claims priority, application Japan, Jan. 31, 1981, 56-13101; Mar. 6, 1981, 56-30298[U]; Mar. 6, 1981, 56-30299[U]

Int. Cl.³ F02M *11/04*

U.S. Cl. 123—432 **6 Claims**

1. An air-fuel mixture intake apparatus for an internal combustion engine having a combustion chamber and an intake valve therefor, said apparatus comprising:

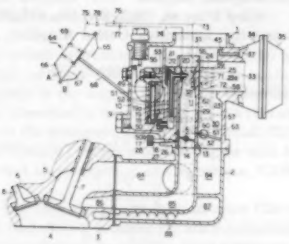
a primary intake passage having a primary venturi and a primary intake passage for providing communication between said primary venturi and the combustion chamber to supply an air-fuel mixture into the combustion chamber under all loads;

a secondary intake passage having a secondary venturi and a secondary intake passage for providing communication between said secondary venturi and the combustion chamber to supply an air-fuel mixture into the combustion chamber under medium and high loads;

a primary throttle valve disposed in said primary intake passage;

a secondary throttle valve disposed in said secondary intake passage;

a vacuum-operated actuator for said secondary throttle valve having primary and secondary vacuum pickup probes respectively in said primary and secondary venturi, a vacuum chamber, a diaphragm partly defining said vacuum chamber, a link rod operatively coupled to said secondary throttle valve, primary and secondary vacuum signal passageways respectively connected to said primary and secondary vacuum pickup probes, and a common vacuum signal passageway communicating between said vacuum chamber and said primary and secondary vacuum signal passageways, said diaphragm being displaceable to cause said link rod to open said secondary throttle valve when a predetermined vacuum developed in said primary venturi and subsequently in said secondary venturi is introduced into said vacuum chamber through said primary and secondary vacuum signal passageways and said common vacuum signal passageway; and



means for slowing down said secondary throttle valve in its opening motion, said means comprising a delay valve disposed in said primary vacuum signal passageway for delaying an air flow therethrough toward said primary vacuum pickup probe.

4,487,186

METHOD AND APPARATUS FOR OPTIMIZING THE OPERATIONAL VARIABLES OF AN INTERNAL COMBUSTION ENGINE

Josef Wahl, Stuttgart, and Peter Schmidt, Schwieberdingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 63,632, Aug. 2, 1979, abandoned. This application Nov. 23, 1981, Ser. No. 323,795

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1978, 2847021

Int. Cl.³ F02D *33/00*

U.S. Cl. 123—436 **4 Claims**

1. An apparatus for optimizing fuel consumption operational variables of an internal combustion engine comprising:

means for detecting changes in operational variables of said engine;

an intake manifold having a throttle valve and a bypass

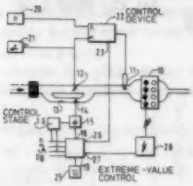
channel bypassing said throttle valve for controlling air flow to said engine;

an auxiliary throttle valve in said bypass channel;

a control means responsive to at least one of the following conditions: the appearance of at least one of certain operational variables and changes in operational variables for changing the position of said auxiliary throttle for changing the λ value;

timing means connected to said control means for generating selected times for operation of said control means;

means for setting the mixture composition in accordance with changes in specific operational variables,



means responsive to said control means for determining the optimum output of said setting means, and

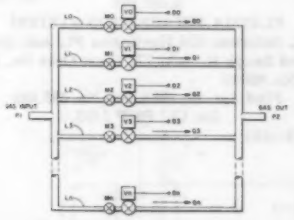
wherein said control means for said auxiliary valve provides a brief test deflection of the auxiliary valve and wherein the influencing of the mixture composition for optimum output through a change in the operational variable ascertained by the actuation of the auxiliary valve occurs only when, after the termination of the brief test deflection of the auxiliary valve, the same operational state of the engine is still present as was present at the beginning of the release of the deflection.

4,487,187

ELECTRONICALLY CONTROLLED FLUID FLORO REGULATING SYSTEM

Don Petro, 228 Pinecrest Crescent NE., Calgary, Alberta, Canada T1Y 1K9

Filed Jan. 31, 1983, Ser. No. 462,360
Claims priority, application Canada, Dec. 10, 1982, 417453
Int. Cl.³ F02M *51/00*
U.S. Cl. 123—478 **31 Claims**



1. Apparatus for controlling the rate of flow of a compressible fluid from a common inlet to a common outlet comprising:

(a) means defining a plurality of fluid conducting lines;

(b) means to connect said plurality of lines in parallel between said common inlet and said common outlet such that the total fluid flow from said common inlet to said common outlet is equal to the sum of the separate flows through the individual lines;

(c) said plurality of lines being adapted to provide flow rates therethrough so related to one another as to be proportional to respective ones of a plurality of preselected numerical values when a differential pressure is maintained between said common inlet and said common outlet sufficient to provide choked flow conditions in said lines;

(d) a control valve located in each of said lines with each said valve being operable to fully open and fully closed positions;

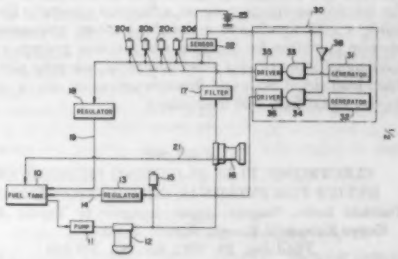
(e) a control means adapted to control selectively the opening and closing of said valves, so that when fluid is supplied to said common inlet at a selected pressure such that the pressure differential between the common inlet and the common outlet is sufficient to create choked flow conditions in said lines, the total fluid flow passing outwardly of said common outlet is controlled in discrete steps in accordance with the opening and closing of said control valves to provide a plurality of predetermined total fluid flow rates at said common outlet.

4,487,188

FUEL SYSTEM FOR INTERNAL COMBUSTION ENGINE

Ryuzaburo Inoue, Yamato; Shoji Tange, Yokosuka, and Yasuhiko Nakagawa, Kamakura, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Nov. 22, 1982, Ser. No. 443,679
Claims priority, application Japan, Nov. 25, 1981, 56-188901
Int. Cl.³ F02N *17/00*; F02D *5/02*
U.S. Cl. 123—491 **4 Claims**



1. A fuel system for an internal combustion engine having an intake manifold branched to respective cylinders of said engine, said fuel system comprising:

(a) a source of fuel;

(b) a motor-driven pump connected to said fuel source for discharging, at its discharge side, fuel pressurized to a predetermined pressure level;

(c) an engine-driven pump connected to said motor-driven pump discharge side for discharging, at its discharge side, fuel pressurized to varying pressure levels as a function of engine speed;

(d) a plurality of hgh-pressure fuel injectors connected to said engine-driven pump discharge side for injecting fuel into said respective cylinders;

(e) a low-pressure fuel injector connected to said motor-driven pump discharge side for injecting fuel into said intake manifold near its entrance; and

(f) a control unit adapted to maintain said high-pressure fuel injectors disabled to stop fuel supply to said engine cylinders while operating said low-pressure fuel injector to supply, into said intake manifold, fuel in amounts varying as a function of at least one engine operating parameter when the fuel pressure is below a predetermined high pressure level at said engine-driven pump discharge side, said control unit operating said high-pressure fuel injectors to supply, into said engine cylinders, fuel in amounts varying as a function of the engine operating parameter while holding said low-pressure fuel injector to terminate fuel supply to said intake manifold after the fuel pressure reaches the predetermined high pressure level.

4,487,189

CONTROL MECHANISM FOR FUEL METERING OF A COMBUSTION ENGINE

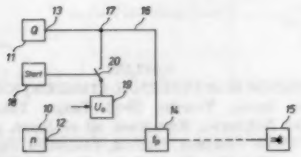
Michael Horbelt, Schieberdingen, and Herbert Arnold, Eberdingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Continuation of Ser. No. 247,026, Mar. 24, 1981, abandoned. This application Mar. 22, 1983, Ser. No. 477,783

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1980, 3011638

Int. Cl.³ F02B *3/00*

U.S. Cl. 123—491 **8 Claims**



1. A control system for a fuel metering system of an internal combustion engine having a pulse generator to which load and rpm signals are supplied from an rpm sensor and a load sensor for forming an injection signal, a function generator for simulating a load signal, and a switching means responsive to a start-up operation for coupling said function generator to the load signal input of said pulse generator, whereby said simulated load signal from said function generator can be coupled to said signal from said load sensor.

4,487,190

ELECTRONIC FUEL INJECTING METHOD AND DEVICE FOR INTERNAL COMBUSTION ENGINE

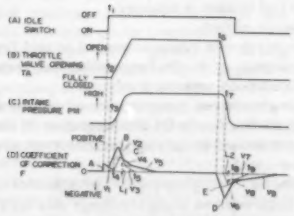
Toshiaki Isobe, Nagoya, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Jun. 23, 1982, Ser. No. 391,433

Claims priority, application Japan, Feb. 25, 1982, 57-29484

Int. Cl.³ F02D *5/00*

U.S. Cl. 123—492 **9 Claims**



1. Electronic fuel injecting method for an internal combustion engine comprising the steps of:

obtaining a basic injection time in accordance with an intake pressure of the engine and an engine rotational speed;

increasing a throttle valve opening correction in accordance with an increasing speed of the throttle valve opening, and subsequently attenuating the throttle valve opening correction gradually at a predetermined attenuation rate;

increasing an intake pressure correction in accordance with an increasing speed of the intake pressure, and subsequently attentuating the intake pressure correction gradually at a predetermined attentuation rate, the throttle valve opening correction predetermined attentuation rate being greater than the intake pressure correction attentuation rate;

combining the throttle valve opening correction and the intake pressure correction to obtain a correction value for acceleration and deceleration; and

correcting the basic injection time in accordance with the correction value.

4,487,191

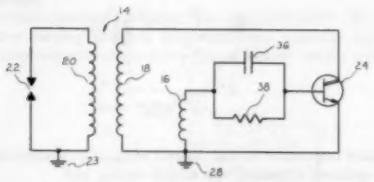
SOLID STATE IGNITION SYSTEM HAVING DRIFT-FREE TIMING

Michael J. Piteo, Enfield, Conn., assignor to R. E. Phelon Company, Inc., East Longmeadow, Mass.

Filed Nov. 14, 1983, Ser. No. 550,788

Int. Cl.³ F02P *3/04*

U.S. Cl. 123—652 **3 Claims**



1. Breakerless inductive ignition system comprising a stator including a ferromagnetic core, an ignition coil disposed on said core and having primary and secondary windings magnetically coupled for transformer action, a rotor with magnet means carried thereby for inducing flux generated voltages in the primary winding of said ignition coil as the magnet means rotates past said core, a Darlington transistor having collector, emitter and base electrodes, circuit means interconnecting the collector and emitter electrodes of the Darlington transistor to the opposite ends of said primary winding, said stator including a trigger coil, a capacitor and resistor in parallel and being connected to one end of the trigger coil and the base of said transistor, the capacitance of said capacitor and the resistance of said resistor being selected to eliminate the retard angle resulting from the inductive reactance of said trigger coil.

4,487,192

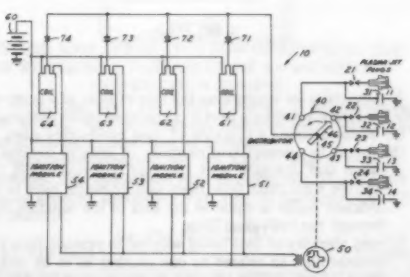
PLASMA JET IGNITION SYSTEM

Richard W. Anderson, 410 Huntington Pl., Ann Arbor, Mich. 48104, and Joseph R. Asik, 776 Great Oaks Dr., Bloomfield Hills, Mich. 48013

Filed Apr. 18, 1983, Ser. No. 485,985

Int. Cl.³ F02P *1/00*

U.S. Cl. 123—654 **2 Claims**



1. An ignition system for an internal combustion engine having a capacitive plasma jet plug means associated with an energy delivery system, said plug means including:

a plasma cavity coupled to the energy delivery system for generating an ignition spark;

a capacitor connected in parallel with said plasma cavity and to the energy delivery system for receiving energy so that when the breakdown voltage of said plasma cavity is reached additional energy from said capacitor is supplied to said plasma cavity to form a plasma jet;

an auxiliary gap in series with said plasma cavity to increase the required breakdown voltage before said plasma cavity generates a spark;

said capacitor being connected in parallel with the series combination of said plasma cavity and said auxiliary gap for receiving a charge from an ignition module to provide for increased energy for the spark event when breakdown occurs in said auxiliary gap;

said capacitive plasma jet plug means being integrally formed to include said auxiliary gap, said plasma cavity and said capacitor;

said energy delivery system being adapted to provide at least 100 millijoules of energy and including a distributor having secondary contacts coupled to said plasma jet plug means for providing spark energy and a primary contact for receiving spark energy; and

an ignition means coupled to said primary contact, said ignition means including a plurality of ignition coils connected in parallel and each ignition coil coupled to an ignition module so that said ignition coils are activated simultaneously to provide an increased charging energy.

4,487,193

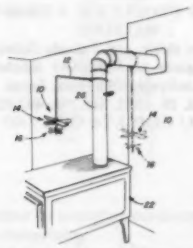
THERMALLY OPERATED PROPELLER ASSEMBLY

Terry E. Richards, and Janet A. Richards, both of 56467 N. Bank Rd., McKenzie Bridge, Oreg. 97401

Filed Oct. 19, 1983, Ser. No. 543,472

Int. Cl.³ F24C *1/00*

U.S. Cl. 126—58 **11 Claims**



1. A propeller assembly for indicating when a stove operates at a normal temperature and at an excessive temperature comprising first and second propellers, suspension means for suspending the propellers so that each propeller can be rotated by rising air currents, the propellers having different rotational characteristics so that when suspended above a stove one of the propellers requires a force to commence rotation generated by rising air currents produced when the stove attains the normal temperature, and the other propeller requires a greater force to commence rotation generated by rising air currents produced when the stove attains the excessive temperature.

4,487,194

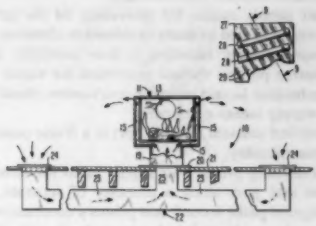
AERO CIRCULATOR STOVE

Richard A. Silvers, 119 N. Lot #D; Joseph English, and Lester English, both of 67809 E. Highway 50, all of Montrose, Colo. 81401

Filed Aug. 15, 1983, Ser. No. 522,963

Int. Cl.³ F24B *3/00*

U.S. Cl. 126—67 **1 Claim**



1. An aero circulator stove, comprising, a fire box inside a jacket, and means for air of a household room to circulate through said jacket; said means comprising a duct unit attached to an air intake side of said jacket; said duct unit including cold air entry registers located a substantial distance from hot air outlets of said jacket, so that heated air from said outlets travels said distance in said room to said registers; and said jacket including means for intensifying heat therewithin, said means comprising each opposite side wall of said fire box being made of corrugated sheet material in which the corrugations thereof extend upwardly at an inclined angle, and a plurality of angle irons are secured to an inner side of each said wall, said angle irons being horizontally inclined and at right angles to said corrugation.

4,487,195

FUEL BURNING HEATING APPARATUS

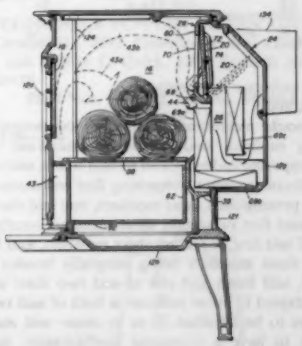
Duncan C. Syme, Chelsea; Eldon L. Caldwell, Barnard; Robert W. Ferguson, South Royalton; Derik K. Andors, Randolph, and Charles B. McLaughlin, Jr., Rutland, all of Vt., assignors to Vermont Castings, Inc., Randolph, Vt.

Filed Sep. 30, 1982, Ser. No. 430,471

Claims priority, application United Kingdom, Jun. 1, 1982, 8215946

Int. Cl.³ F24C *1/14*

U.S. Cl. 126—77 **26 Claims**



1. A fuel burning heating apparatus for operating in either a first combustion mode or a second combustion mode comprising

a heat conducting frame assembly enclosing

a primary combustion chamber including grate means for

supporting a fuel mass directly above means defining an ash collection area, and

a secondary combustion chamber in gaseous communication with said primary combustion chamber,

a baffle, a portion of said baffle separating said primary and secondary combustion chambers, and said baffle having a first baffle opening gaseously connecting said primary and secondary combustion chambers for providing said gaseous communication therebetween,

a first air supply means for providing air for promoting combustion in said primary combustion chamber,

said frame assembly including a door assembly having a transparent portion thereof positioned for visual viewing of combustion in said primary combustion chamber, and

said air supply means comprising

a controlled ambient air inlet port in a frame panel of said frame assembly,

means defining primary air supply paths for directing air from said port along a plurality of separate, closed, elongated paths around said primary combustion chamber and outside said fuel mass and ash collection area toward the door assembly at a front panel of said apparatus, and

means for directing said air from said respective paths at said door assembly along an inside surface of said door assembly and across said transparent portion,

whereby, before encountering the combustion chamber, controlled, preheated uncombusted air is directed across said transparent portion of said door assembly for maintaining said transparent portion clean and effectively insulated from the products of combustion within said primary combustion chamber and the fuel mass is top-fired.

4,487,196

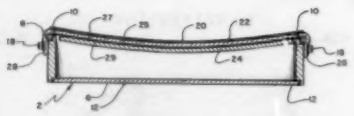
FOCUSING SOLAR COLLECTOR AND METHOD FOR MANUFACTURING SAME

Lawrence M. Murphy, Lakewood, Colo., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 8, 1982, Ser. No. 440,193

Int. Cl.³ F24J 3/02

U.S. Cl. 126—438 **20 Claims**



1. A solar collector comprising:

a. a frame; and

b. a composite membrane member for concentrating and focusing sunlight, said composite membrane member being supported and tensioned by said frame, said composite membrane member comprising first and second differentially pretensioned sheet members, one said sheet member of said first or second sheet members overlying the other of said first or second sheet members, said first and second sheet members being integrally bonded to one another, said frame and one of said two sheet members being adapted to allow tensions in both of said two sheet members to be adjusted so as to cause said membrane member to have a contoured configuration, said contoured configuration enabling said membrane member to be focusable, and wherein an adjustment of said tension in one of said two bonded sheet members provides a reciprocal adjustment in a focus provided by said membrane member.

4,487,197

SOLAR CONTROL PANEL

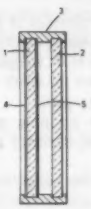
Jean-Claude Hoyois, Ham-sur-Heure, Belgium, assignor to Glaverbel, Brussels, Belgium

Filed Apr. 23, 1982, Ser. No. 371,476

Claims priority, application United Kingdom, Apr. 29, 1981, 8113181

Int. Cl.³ F24J 3/02

U.S. Cl. 126—901 **4 Claims**



1. A glazing panel for transmitting radiant energy including visible light energy, comprising: first and second clear glass sheets; support means positioning said glass sheets in parallel spaced relation, such that one surface of said first glass sheet defines an exterior surface of said panel; a first coating on said one surface of said first glass sheet for providing solar shading, said first coating being an energy absorbing oxide coating; and a second coating on the surface of said first sheet which faces said second sheet, said second coating being made of gold; wherein said first glass sheet has a thickness of 4 mm, said second glass sheet has a thickness of 6 mm, said first coating consists of 62%, CoO, 26% Fe_2O_3 and 12% Cr_2O_3 and has a thickness between 35 and 45 nm, said second coating has a thickness of 14 nm and an emissivity of 0.09, said panel further comprises an undercoating of bismuth oxide located on said first glass sheet beneath said second coating, said undercoating being 1 nm thick, said first glass sheet and said first coating together having an absorption factor of 22.0%, and said panel having a luminous transmission factor of 20.6%, a total energy transmission factor of 18.7% and a color purity when viewed in reflection of 8%.

4,487,198

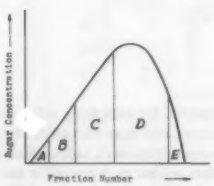
PROCESS FOR PRODUCING A HIGH-PURITY MALTOSE

Toshio Miyake; Shuzo Sakai, and Takashi Shibuya, all of Okayama, Japan, assignors to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo, Okayama, Japan

Filed Jul. 28, 1982, Ser. No. 402,823

Int. Cl.³ C13D 3/14; C13K 7/00

U.S. Cl. 127—46.3 **7 Claims**



1. A process for the separation of maltose from a feed solution by the utilization of an ion exchange resin, comprising:

(a) providing a feed solution containing at least 70% maltose based on the weight of the dry solid, the remainder consisting essentially of glucose and dextrins;

(b) sequentially admitting predetermined volumes of the feed solution and water to a column of a strongly acidic cation exchange resin having sulphonyl groups of an alkali metal or alkaline earth metal form;
(c) sequentially separating the effluents from the column into the following fractions:
a first fraction rich in dextrins,
a second fraction rich in dextrins, but highly contaminated with maltose,
a third fraction of substantially pure maltose,
a fourth fraction rich in maltose, but highly contaminated with glucose, and
a fifth fraction rich in glucose;
(d) recovering the third fraction of substantially pure maltose;
(e) sequentially admitting into the column:
the second fraction obtained in the step (c),
a feed solution having a maltose content of at least 70% based on the weight of dry solid, and the remainder consisting essentially of glucose and dextrin,
the fourth fraction obtained in the step (c), and
water; and
(f) repeating steps (c), (d) and (e) in a cyclic manner.

4,487,199

DEVICE FOR IMPARTING CONTINUOUS PASSIVE MOTION TO HUMAN JOINTS

John H. Saringer, Toronto, Canada, assignor to Imasco-CDC Research Foundation, Toronto, Canada

Filed Mar. 29, 1982, Ser. No. 362,896
Claims priority, application Canada, Oct. 23, 1981, 388659
Int. Cl.³ A61H *1/02*
U.S. Cl. 128—25 R **11 Claims**

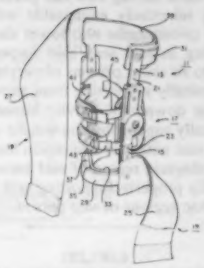
11. An apparatus for imparting continuous passive motion to a human joint, comprising,
a support and linked thereto first connecting means for connection to a part of the body at one side of a joint to be mobilized,
traveller means movable in a linear path relative to the support provided with second connecting means for connection to a part of the body at the other side of the joint to be mobilized whereby the joint forms a movable link which is flexed as the travelling means moves back and forth relative to the support,
motor drive means imparting to the traveller means substantially continuous slow rhythmic reciprocating movement,
and means for reversing the motor drive means at any point in its path to continue the reciprocating movement.

4,487,200

BRACE FOR KNEE

Michael P. Feanny, Cleburne, and David L. Cumins, Rio Vista, both of Tex., assignors to Medical Designs, Inc., Azle, Tex.

Filed Apr. 25, 1983, Ser. No. 488,268
Int. Cl.³ A61F *3/00*
U.S. Cl. 128—80 C **7 Claims**



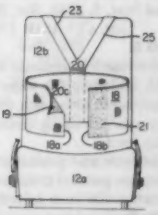
1. A knee brace for alleviating problems with tibia rotation and tibia desubluxation with respect to the femur of respective proximal and distal members of a wearer, comprising:
a. first and second pairs of elongate braces with each of said braces being relatively stiff so as to resist both torsion and bending forces; said first pair of braces being adapted to lie on opposite sides of the wearer's thigh and said second pair of braces being adapted to lie on opposite sides of the wearer's calf;
b. a pair of respective hinge means connected respectively with said first and second pairs of braces at their respective central ends for allowing controlling flexion and extension of the wearer's leg, and
c. means for adjustably placing and holding respective pairs of elongate braces desired attained positions on respective opposite sides of the wearer's thigh and calf with said hinge means positioned correctly adjacent the wearer's knee; the improvement comprising:
d. an anterior cuff connected with said second pair of braces on opposite sides of the wearer's calf having a wedge connected therewith; the wedge being disposed so as to ride against the leg at the inside anterior of the tibia for preventing rotation of the tibia.

4,487,201

ORTHOPEDIC BACK SUPPORT FOR AN AUTOMOBILE

Ernest Ciambarella, 3511 Constitution St., Cincinnati, Ohio 45211, and Jeffrey L. Quirk, 1302 Epworth Ave., Dayton, Ohio 45410

Filed Nov. 19, 1982, Ser. No. 443,062
Int. Cl.³ A61F *13/00*
U.S. Cl. 128—134 **13 Claims**



1. In combination with an automobile having a seat therein, said seat having a substantially horizontal support and a sub-

supporting a fuel mass directly above means defining an ash collection area, and

a secondary combustion chamber in gaseous communication with said primary combustion chamber,

a baffle, a portion of said baffle separating said primary and secondary combustion chambers, and said baffle having a first baffle opening gaseously connecting said primary and secondary combustion chambers for providing said gaseous communication therebetween,

a first air supply means for providing air for promoting combustion in said primary combustion chamber,

said frame assembly including a door assembly having a transparent portion thereof positioned for visual viewing of combustion in said primary combustion chamber, and

said air supply means comprising

a controlled ambient air inlet port in a frame panel of said frame assembly,

means defining primary air supply paths for directing air from said port along a plurality of separate, closed, elongated paths around said primary combustion chamber and outside said fuel mass and ash collection area toward the door assembly at a front panel of said apparatus, and

means for directing said air from said respective paths at said door assembly along an inside surface of said door assembly and across said transparent portion,

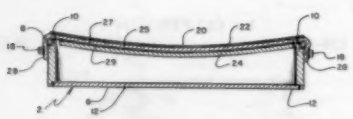
whereby, before encountering the combustion chamber, controlled, preheated uncombusted air is directed across said transparent portion of said door assembly for maintaining said transparent portion clean and effectively insulated from the products of combustion within said primary combustion chamber and the fuel mass is top-fired.

4,487,196

FOCUSING SOLAR COLLECTOR AND METHOD FOR MANUFACTURING SAME

Lawrence M. Murphy, Lakewood, Colo., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 8, 1982, Ser. No. 440,193
Int. Cl.³ F24J *3/02*
U.S. Cl. 126—438 **20 Claims**



1. A solar collector comprising:

a. a frame; and

b. a composite membrane member for concentrating and focusing sunlight, said composite membrane member being supported and tensioned by said frame, said composite membrane member comprising first and second differentially pretensioned sheet members, one said sheet member of said first or second sheet members overlying the other of said first or second sheet members, said first and second sheet members being integrally bonded to one another, said frame and one of said two sheet members being adapted to allow tensions in both of said two sheet members to be adjusted so as to cause said membrane member to have a contoured configuration, said contoured configuration enabling said membrane member to be focusable, and wherein an adjustment of said tension in one of said two bonded sheet members provides a reciprocal adjustment in a focus provided by said membrane member.

4,487,197

SOLAR CONTROL PANEL

Jean-Claude Hoyois, Ham-sur-Heure, Belgium, assignor to Glaverbel, Brussels, Belgium

Filed Apr. 23, 1982, Ser. No. 371,476
Claims priority, application United Kingdom, Apr. 29, 1981, 8113181
Int. Cl.³ F24J *3/02*
U.S. Cl. 126—901 **4 Claims**

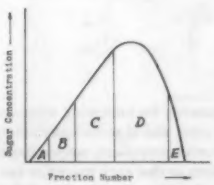
1. A glazing panel for transmitting radiant energy including visible light energy, comprising: first and second clear glass sheets; support means positioning said glass sheets in parallel spaced relation, such that one surface of said first glass sheet defines an exterior surface of said panel; a first coating on said one surface of said first glass sheet for providing solar shading, said first coating being an energy absorbing oxide coating; and a second coating on the surface of said first sheet which faces said second sheet, said second coating being made of gold; wherein said first glass sheet has a thickness of 4 mm, said second glass sheet has a thickness of 6 mm, said first coating consists of 62%, CoO, 26% Fe_2O_3 and 12% Cr_2O_3 and has a thickness between 35 and 45 nm, said second coating has a thickness of 14 nm and an emissivity of 0.09, said panel further comprises an undercoating of bismuth oxide located on said first glass sheet beneath said second coating, said undercoating being 1 nm thick, said first glass sheet and said first coating together having an absorption factor of 22.0%, and said panel having a luminous transmission factor of 20.6%, a total energy transmission factor of 18.7% and a color purity when viewed in reflection of 8%.

4,487,198

PROCESS FOR PRODUCING A HIGH-PURITY MALTOSE

Toshio Miyake; Shuzo Sakai, and Takashi Shibuya, all of Okayama, Japan, assignors to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo, Okayama, Japan

Filed Jul. 28, 1982, Ser. No. 402,823
Int. Cl.³ C13D *3/14*; C13K *7/00*
U.S. Cl. 127—46.3 **7 Claims**



1. A process for the separation of maltose from a feed solution by the utilization of an ion exchange resin, comprising:

(a) providing a feed solution containing at least 70% maltose based on the weight of the dry solid, the remainder consisting essentially of glucose and dextrins;

(b) sequentially admitting predetermined volumes of the feed solution and water to a column of a strongly acidic cation exchange resin having sulphonyl groups of an alkali metal or alkaline earth metal form;
(c) sequentially separating the effluents from the column into the following fractions:
a first fraction rich in dextrins,
a second fraction rich in dextrins, but highly contaminated with maltose,
a third fraction of substantially pure maltose,
a fourth fraction rich in maltose, but highly contaminated with glucose, and
a fifth fraction rich in glucose;
(d) recovering the third fraction of substantially pure maltose;
(e) sequentially admitting into the column:
the second fraction obtained in the step (c),
a feed solution having a maltose content of at least 70% based on the weight of dry solid, and the remainder consisting essentially of glucose and dextrin,
the fourth fraction obtained in the step (c), and
water; and
(f) repeating steps (c), (d) and (e) in a cyclic manner.

4,487,199

DEVICE FOR IMPARTING CONTINUOUS PASSIVE MOTION TO HUMAN JOINTS

John H. Saringer, Toronto, Canada, assignor to Imasco-CDC Research Foundation, Toronto, Canada

Filed Mar. 29, 1982, Ser. No. 362,896
Claims priority, application Canada, Oct. 23, 1981, 388659
Int. Cl.³ A61H *1/02*
U.S. Cl. 128—25 R **11 Claims**

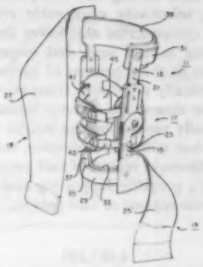
11. An apparatus for imparting continuous passive motion to a human joint, comprising,
a support and linked thereto first connecting means for connection to a part of the body at one side of a joint to be mobilized,
traveller means movable in a linear path relative to the support provided with second connecting means for connection to a part of the body at the other side of the joint to be mobilized whereby the joint forms a movable link which is flexed as the travelling means moves back and forth relative to the support,
motor drive means imparting to the traveller means substantially continuous slow rhythmic reciprocating movement,
and means for reversing the motor drive means at any point in its path to continue the reciprocating movement.

4,487,200

BRACE FOR KNEE

Michael P. Feanny, Cleburne, and David L. Cumins, Rio Vista, both of Tex., assignors to Medical Designs, Inc., Azle, Tex.

Filed Apr. 25, 1983, Ser. No. 488,268
Int. Cl.³ A61F *3/00*
U.S. Cl. 128—80 C **7 Claims**



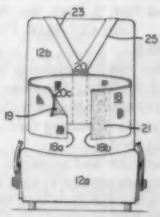
1. A knee brace for alleviating problems with tibia rotation and tibia desubluxation with respect to the femur of respective proximal and distal members of a wearer, comprising:
a. first and second pairs of elongate braces with each of said braces being relatively stiff so as to resist both torsion and bending forces; said first pair of braces being adapted to lie on opposite sides of the wearer's thigh and said second pair of braces being adapted to lie on opposite sides of the wearer's calf;
b. a pair of respective hinge means connected respectively with said first and second pairs of braces at their respective central ends for allowing controlling flexion and extension of the wearer's leg, and
c. means for adjustably placing and holding respective pairs of elongate braces desired attained positions on respective opposite sides of the wearer's thigh and calf with said hinge means positioned correctly adjacent the wearer's knee; the improvement comprising:
d. an anterior cuff connected with said second pair of braces on opposite sides of the wearer's calf having a wedge connected therewith; the wedge being disposed so as to ride against the leg at the inside anterior of the tibia for preventing rotation of the tibia.

4,487,201

ORTHOPEDIC BACK SUPPORT FOR AN AUTOMOBILE

Ernest Ciambarella, 3511 Constitution St., Cincinnati, Ohio 45211, and Jeffrey L. Quirk, 1302 Epworth Ave., Dayton, Ohio 45410

Filed Nov. 19, 1982, Ser. No. 443,062
Int. Cl.³ A61F *13/00*
U.S. Cl. 128—134 **13 Claims**



1. In combination with an automobile having a seat therein, said seat having a substantially horizontal support and a sub-

stantially vertical back support, an apparatus for partially transferring body weight from the lower lumbo-sacral and pelvic regions by supporting the weight of a person's lower thoracic region in said automobile, said apparatus comprising:

a flexible suspension band, said suspension band being disposed adjacent to said vertical back support, said suspension band being spaced from said horizontal support, said suspension band having two end portions, said end portions being selectively engageable with each other to completely circumscribe said lower thoracic region of a person sitting in said seat, said suspension band being adjustable to fit about persons of varying size; and

means for vertically supporting from above said suspension band against downward gravity biased movement, said means partially supporting the weight of said person sitting in said seat with said suspension band circumscribing said lower thoracic region of said person, said apparatus othopedically properly supporting said lower lumbo-sacrial and pelvic regions of said person.

4,487,202

TESTIS SUPPORT FOR ELEVATING AND TREATING DISEASED TESTES AND EPIDIDYMIDES

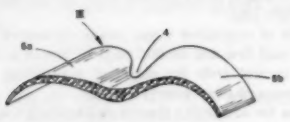
Hans Sachse, Lerchenstr. 55, 85 Nurnberg GO, Fed. Rep. of Germany

Filed Mar. 3, 1983, Ser. No. 471,775

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1982, 3209427

Int. Cl.³ A61F *5/40*

U.S. Cl. 128—158 **7 Claims**



1. An improved surgical testis support device for elevating and supporting for treatment the diseased testis and epididymides of a recumbant male, said device comprising:

a generally rectangular seating member for positioning across the thighs of a male;

said seating member being non planar and having curved wings at each end to generally conform to said thighs;

a generally "V" shaped curved notch between said curved wings for location beneath the male testes; and

a recess along one longitudinal edge of said seating member at said "V" shaped curved notch for accommodating and to underlie the male scrotum when said seating member is positioned to support said testes.

4,487,203

TRIPLANAR KNEE RESECTION METHOD

Gary W. Androphy, P.O. Box 533, Gurnee, Ill. 60031

Filed Nov. 3, 1981, Ser. No. 317,875

Int. Cl.³ A61B *17/00*

U.S. Cl. 128—303 R **8 Claims**

1. A method for making triplanar bone resections for total knee replacement, including the steps of:

resecting the proximal tibia such that it is perpendicular to an imaginary axis extending through the ankle joint, knee joint, and hip joint;

resecting the anterior and posterior distal femoral condyles such that they are parallel to each other and perpendicular to said axis when the knee is in flexion;

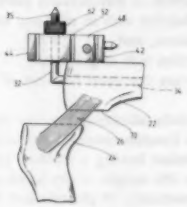
determining the flexion gap;

inserting an L-shaped femur guide rod into the medullary canal of the femur, the femur guide rod having a first portion and a second portion disposed at a right angle with respect to said first portion, the first portion being inserted in said canal;

placing the knee in extension;

partially extending said guide rod relative to said femur such that the outer surface of the second portion abuts the resected proximal tibia;

affixing a guide member having a first planar slot therein onto the second portion of said guide rod such that said



slot is disposed perpendicular to the femoral medullary canal and relative to said canal to compensate for the valgus angle and such that said slot is spaced from the outer surface of the second portion a distance equal to the flexion gap;

placing the knee in flexion, while maintaining said guide rod relative to the distal femur; and

resecting the distal femur in reference to said slot while the knee is in flexion.

4,487,204

DEVICE FOR APPLYING HAEMOSTATIC CLIPS

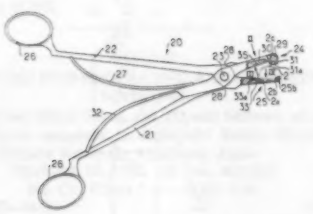
Georges Hrouda, Paris, France, assignor to Nomel, France

Filed Oct. 12, 1982, Ser. No. 433,672

Claims priority, application France, Oct. 14, 1981, 81 19348; Feb. 12, 1982, 82 02366

Int. Cl.³ A61B *17/12*

U.S. Cl. 128—325 **23 Claims**



1. A haemostatic clip applying device on a flexible duct to be obturated, such as a blood vessel, said device exhibiting the shape of forceps and comprising

two arms mounted in pivotal relationship with respect to one another about a pivot pin and having ring-like gripping means at free ends thereof for moving a pair of jaws between which a haemostatic clip is arranged, the haemostatic clip constituted by a flexible blade having two free end portions, one of which is bent into a hook, and two legs defined by a bend at a substantially central portion of the haemostatic clip to form therebetween a substantially open angle in which the flexible duct is situated,

pivoting movement of said arms with said gripping means causing said jaws to bring both legs of the haemostatic clip together and lock the same to form a loop, followed by flattening of the loop or crushing of the legs of the haemostatic clip when one of said jaws is applied against the

other of said jaws to obturate the flexible duct therebetween,

wherein said jaw to be applied upon the other of said jaws comprises two jaw elements arranged to be successively applied onto the other of said jaws,

a first one of said jaw elements pivotally connected to said first arm about said pin and having at an end thereof, an element projecting towards the other of said jaws and defining a substantially central opening, and

a second jaw element accommodated within said substantially central opening of said first jaw element and also pivotally connected to said first arm,

so that by bringing said first and second arms together, said first jaw element is applied upon the other of said jaws so that said projecting element folds the hooked end of the haemostatic clip back over the other, substantially straight end of the haemostatic clip to positively lock these ends, and

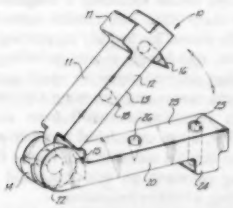
by continuing to bring both said first and second arms together, said second jaw element is applied upon the other of said jaws for flattening or crushing the formed loop of the haemostatic clip, while effectively controlling the obturation of the flexible duct, with the haemostatic clip having a substantially straight operative position.

4,487,205

NON-METALLIC, BIO-COMPATIBLE HEMOSTATIC CLIPS

John Di Giovanni, Irvington; Glen C. Dorband, Somerville, and Donald M. Golden, Cherry Hill, all of N.J., assignors to Ethicon, Inc., Somerville, N.J.

Filed Apr. 26, 1982, Ser. No. 371,845
Int. Cl.³ A61B *17/12*
U.S. Cl. 128—326 **6 Claims**



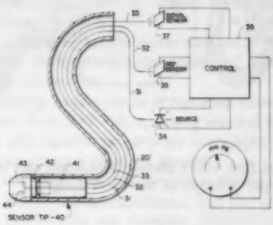
1. A hemostatic clip of a relatively nonresilient and nondeformable polymeric material comprising a pair of leg members, said leg members having opposed vessel clamping surfaces, said leg members being attached or attachable at their proximal ends in a rotatable hinge portion, said hinge portion comprising a pin integral with and disposed at the proximal end of one of the leg member and a complementary hook or eye integral with and disposed at the proximal end of the other leg member, a protrusion adjacent said hook or eye member causing the leg members to diverge from one another to hold the clip in an open position, said pin being sized to fit within the hook or eye, said hook or eye contacting the periphery of the pin and being rotatable about a portion of the periphery of the pin to move said protrusion out of its original position to allow said leg member to be moved from an open position wherein the legs diverge from one another to a closed position wherein the legs are substantially parallel with the vessel clamping surfaces adjacent one another and locking means for maintaining the legs substantially parallel when the clip is in a closed position.

4,487,206

FIBER OPTIC PRESSURE SENSOR WITH TEMPERATURE COMPENSATION AND REFERENCE

Roger L. Aagard, Richfield, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 13, 1982, Ser. No. 434,028
Int. Cl.³ A61B *5/02*
U.S. Cl. 128—667 **11 Claims**



1. An intravascular blood pressure catheter of the fiber optic type comprising:

a catheter member containing at least three optic fibers including a source fiber, a signal fiber and a reference fiber;

a catheter sensing tip including a pressure deformable diaphragm with an inside face, the diaphragm having a reflecting surface finish on the inside face;

means for directing a source of light through said source optic fiber toward said tip, said source of light being controlled in intensity;

a transparent body fastened to an end of said fibers into which body light emanates from said source fiber, said body including light-collimating lens means for redirecting light emanating from the source fiber into a column toward said reflecting surface finish and for directing reflected light therefrom falling on said lens means towards said signal optic fiber, said body further including mirror means positioned to receive a portion of the light transmitted into said body from said source optic fiber and oriented to reflect said portion into said reference fiber;

signal sensing means for detecting the intensity of reflected light being returned in said signal optic fiber, the amount of light collected by the signal fiber being a function of the pressure;

reference sensing means for detecting the intensity of reflected light being returned in said reference fiber; and,

control means responsive to the output of said reference sensing means to control the intensity of said source of light.

4,487,207

LUNG EXERCISING DEVICE AND METHOD

Edward Fitz, 27 Llanfair Rd., Ardmore, Pa. 19003

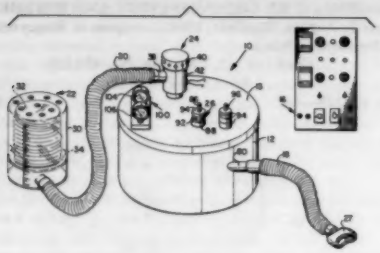
Filed Oct. 15, 1981, Ser. No. 311,667
Int. Cl.³ A61B *5/08*
U.S. Cl. 128—728 **25 Claims**

1. A device for increasing the strength and inhalation capacity of the users' lungs including:

an air inlet and an air outlet, a conduit connecting said inlet and said outlet, said outlet including a mouthpiece,

a first valve in said conduit, said first valve being operable by the pressure differential created when the user inhales through said mouthpiece,

means for biasing said first valve to normally closed position, said means being adjustable so that the force required to



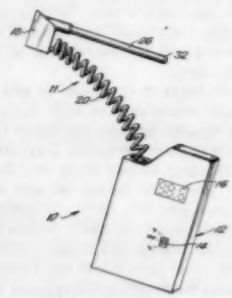
open said first valve during inhalation can be varied to increase the strength of the users' lungs.

4,487,208

FAST RESPONSE THERMORESISTIVE TEMPERATURE SENSING PROBE

Bruce H. Kamens, Thomaston, Conn., assignor to Timex Medical Products Corporation, Waterbury, Conn.

Filed Jan. 21, 1983, Ser. No. 459,741
Int. Cl.³ A61B *5/00*
U.S. Cl. 128—736 **15 Claims**



1. A fast response, electronic clinical thermometer for measuring body temperature having a probe with a temperature sensing end comprising:

a thermal sensor assembly including a thin, thermally conductive metal plate member having a peripheral edge and outer and inner surfaces, a temperature sensing element having a low thermal mass and electrically connected and disposed in temperature responsive relationship with said conductive metal plate member on said inner surface, a first small diameter wire lead electrically connected to said inner surface of said metal plate member and a second small diameter wire lead electrically connected to said temperature sensing element, said leads disposed within said probe, and

a probe body comprising a hollow tubular member of electrically insulating plastic material having a low thermal mass, said tubular member having a radially inwardly directed platform defining a central opening larger than said temperature sensing element and smaller than said metal plate member, said platform supporting the peripheral edge on said inner surface of said plate member, said tubular member further defining a deformable peripheral flange surrounding said platform and crimped toward said platform to sealingly engage the peripheral edge of said plate member for clamping said assembly to said probe body producing a contaminant-resistant, closed-end probe which permits only said outer surface of said metal plate member, which is in direct conductive contact with said temperature sensing element, and at least a portion of said probe body, to make contact with the tissues of the body for measuring body temperature.

4,487,209

BIOPSY NEEDLE

Donald N. Mehl, Minnetonka, Minn., assignor to Creative Research and Manufacturing Inc., Minnetonka, Minn.

Continuation of Ser. No. 244,015, Mar. 16, 1981, abandoned.
This application Feb. 22, 1983, Ser. No. 468,147
Int. Cl.³ A61B *10/00*
U.S. Cl. 128—754 **10 Claims**

1. A biopsy needle comprising:

a. tubular cannula means including a longitudinal cannula with a knife sharp edge, said tubular cannula means including handle means for handily supporting said tubular cannula means, said handle means including a truncated conical member secured about an upper portion of said tubular cannula means and opposing vertically oriented handle wings extending outward from said truncated conical member, a rim cylindrical member positioned on said truncated conical member, and means for interlocking extending outward on said rim, said interlocking means including a button projection;

b. stylet means for engaging into said tubular cannula means and protruding forward of said tubular cannula means for piercing through skin, flesh, muscle and bone, including a sharpened angled edge and cap means having supporting positive detent interlocking means for engaging or twisting with said interlocking means of said sample means oriented by said engagement of said interlocking means within said positive detent interlocking means on said cap means, said cap means supporting said stylet means; and

c. said beveled edge of said tubular cannula means and said edge of said stylet means being substantially aligned on a vertical axis with respect to each other, said knife-sharp edge of said cannula has an angular tip relationship so that the offset of the cannual wall satisfies $\frac{1}{2}$(tan (bevel angle) tan(tip angle) (I.D. cannula tube)) whereby said tubular cannula means and said stylet means engage in predetermined oriented relationship with said interlocking means and said positive detent interlocking means thereby provide a positive detent interlocking between said sample means and said protruding means for taking a biopsy sample.

4,487,210

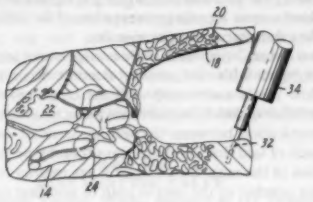
ANCHOR FOR ANCHORING ELECTRODE LEADS USED IN COCHLEAR IMPLANTATION

Walter L. Knudsen, Credit River Township, Scott County, and Paul A. Burgio, Roseville, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Nov. 15, 1982, Ser. No. 441,936

Int. Cl.³ A61N *1/02*

U.S. Cl. 128—785 **3 Claims**



1. In combination, an electrical lead extending to an electrode and an anchor adapted to be inserted in the temporal bone of a human skull and engaging with said lead to help position and hold the electrode at a desired location relative to a cochlea in said skull, said anchor being a screw-like member with a central axis comprising a threaded first end portion adapted to be inserted in a socket in the temporal bone; and a head defining a second end portion of said anchor, said head having a slot transverse to said axis, said slot being generally L-shaped and extending entirely across said head and having an inlet opening extending entirely across said head, said generally L-shaped slot having an outer portion extending inwardly of said head from said inlet opening, and an inner portion extending from the end of said outer portion opposite said inlet opening generally at a right angle to said outer portion, said outer portion having a width adapted to freely receive a portion of said lead and said inner portion frictionally receiving the portion of said lead.

4,487,211

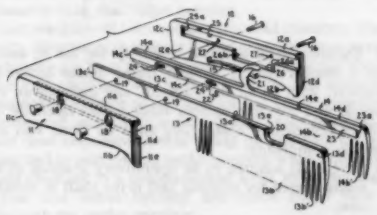
SHEARING COMB

Judy C. Sullivan, 2543 S. Delaware, Springfield, Mo. 65804

Filed May 2, 1983, Ser. No. 490,787

Int. Cl.³ A45D *24/36*

U.S. Cl. 132—45 R **7 Claims**



1. A combined comb and hair cutting instrument comprising, in combination:

(1) a first elongate, flat comb element having an elongate flat, substantially rectangular, inner base extension thereon,

(2) a second elongate, flat cutting element also having an elongate flat, substantially rectangular inner base extension thereon,

(3) said comb and cutting elements each including a normally straight elongate outer, upper spine with a like plurality of substantially individually alike lower tines fixed and extending at substantial right angles thereto, said tines each spaced apart from one another a like distance for hair combing action when said elements are lengthwise aligned with one another,

(4) said elements and extensions of substantially congruent size, shape and form in the several parts thereof with substantially flat, opposed abuttable inboard faces adapted for longitudinal axial sliding motion of the cutting element and its base extension with respect to the comb element and its base extension,

(5) a pair of grasping handle pieces adapted to receive therewithin and therebetween the comb and cutting element inner base extensions,

(6) said grasping handle pieces of matched, substantially like, congruent form with flat, opposing inboard faces adapted to flatly abut against one another in engaging relationship to form an integral grasping handle,

(7) each said grasping handle piece having an elongate groove positioned in the inboard face thereof adapted to receive therewithin one elongate, inboard base extension of the comb or cutting elements,

(8) means communicating between the comb and cutting element spines for normally holding said elements in close, face-to-face, sliding frictional contact while permitting the longitudinal axial movement or reciprocation of the cutting element and its attached base extension with respect to the comb element and its base extension in their engagement with the handle elements and one another,

(9) means fixed to the upper spine portion of the cutting element for operative finger or thumb engagement therewith for reciprocating said cutting element and base extension thereof with respect to the comb element and its base extension, as well as the integral grasping handle, and

(10) means interconnecting the two handle pieces through the cutter and comb element base extensions in such manner as to fix said handle pieces together, maintain said base extensions in face-to-face axial sliding relationship and permit the cutter element and its base extension to axially reciprocate with respect to the said integral grasping handle and the comb element and its base extension,

(11) there being means normally biasing said movable cutting element and its base extension to a comb action position with juxtaposed element tines in congruent registering position with the comb element and its base extension.

4,487,212

VEHICLE PORTS OR VEHICLE COVERING SYSTEMS AND APPARATUS

Richard P. Moore, P.O. Box 471, Germiston, 1400, Transvaal, South Africa

Continuation of Ser. No. 37,801, May 10, 1979, abandoned. This application Jul. 13, 1981, Ser. No. 282,773

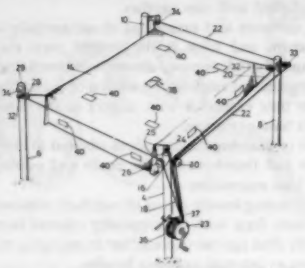
Claims priority, application South Africa, May 6, 1978, 78/3193; May 12, 1978, 78/2745

Int. Cl.³ E04F *10/00*

U.S. Cl. 135—90 **26 Claims**

1. A vehicle covering system comprising a waterproof flexible, rodless, rigid memberless cover that drapes a vehicle snugly by gravity in its lowered or covering position, single source means operable from one position to lift the cover from a vehicle, raise it above the vehicle, tension it and store it in a raised tensioned state and said single source means functioning to lower the cover over a vehicle and relieve the tension, the whole arrangement being such that a vehicle may be driven

into the position in which it may be covered and driven away when it has been uncovered eliminating the necessity for any



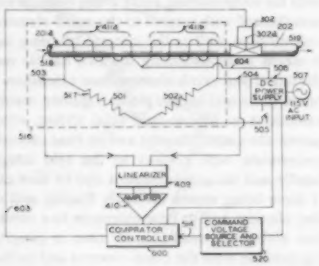
rods or rigid members integral with or directly shaping the cover.

4,487,213

MASS FLOW CONTROLLER APPARATUS

William E. Gates, Sommerset, and Wim J. M. Pieters, Morristown, both of N.J., assignors to Omicron Technology Corporation, Berkeley Heights, N.J.

Filed Sep. 9, 1982, Ser. No. 416,163
Int. Cl.³ G01F *1/68*
U.S. Cl. 137—2 **6 Claims**



1. An apparatus capable of selecting and controlling the mass flow rate of gas through a conduit to be substantially constant over a period of at least 4 hours and within a mass flow rate range of from about 0.05 to about 0.5 ml/min at standard temperature and pressure conditions and a gas partial pressure range of from about 0.03 to 1 which comprises:

an enclosure having an exterior surface and defining an inner space;

means for controlling the temperature within said inner space to be substantially constant;

first conduit means defining an input path for directing the flow of a gas from an input port disposed at the exterior surface of said enclosure into said inner space, and an output path in fluid communication with said input path for directing the flow of said gas out of said inner space to an output port at the exterior surface of said enclosure;

elongate sensing conduit means disposed within said enclosure inner space having an interior channel for directing the flow of a gas therethrough and having an input and an output; the input of said sensing conduit being engaged in fluid communication with the input path of said first conduit means and the output of said sensing conduit being engaged in fluid communication with the output path of said first conduit means, the diameter of said sensing conduit interior channel being not greater than 0.2 mm;

flow meter means disposed within said enclosure inner space and in contact with said sensing conduit for sensing a temperature differential induced by change in the mass flow rate of a gas passing from the input to the output of said sensing conduit, and for generating a first output signal representative of said temperature differential and proportional to the mass flow rate of said gas passing through said sensing conduit;

means for generating a reference second output signal proportional to a selected mass flow rate of a gas;

means disposed within said enclosure inner space for comparing the first and second output signals and generating a third output signal representative of the difference of said first and second output signals;

valve means, disposed within said enclosure inner space engaged with said sensing conduit downstream of said flow meter means and with the output path of said first conduit means for controllably disengaging the fluid communication between the sensing conduit and the output path of said first conduit means thereby permitting regulation of the mass flow rate of a gas passing from said sensing conduit to the output path of said first conduit means, said valve means being actuated by said third output signal;

means for permitting the temperature of a gas passing through the input path of said first conduit means to equilibrate with the substantially constant temperature of said enclosure inner space before said gas enters the sensing conduit means;

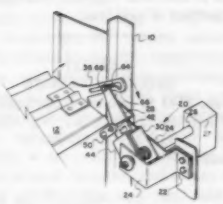
means for controlling the pressure of a gas as it enters the input of said sensing conduit means to be substantially constant.

4,487,214

DAMPER BLADE ACTUATING MECHANISM

James R. Tatum, 8 Kingsway Crescent, Toronto, Ontario, Canada M8X 2R1

Filed Sep. 18, 1981, Ser. No. 303,477
Int. Cl.³ E05F *15/20*
U.S. Cl. 137—72 **5 Claims**



1. Damper blade actuator assembly for use in association with a damper having damper frame means adapted to be associated with an air duct system, and defining an air flow opening, and movable damper blade means operable for partially or completely obstructing such air flow, said actuator assembly comprising;

a drive shaft adapted to be operatively coupled to suitable motor means for rotating said drive shaft in either direction;

an operating arm swingably mounted adjacent said drive shaft and being rotatably movable relative to said drive shaft and connectible with said damper blade means;

a coupling arm attached to said drive shaft for rotation therewith adjacent said operating arm;

spring means connected between said operating arm and said coupling arm, said spring means urging said operating arm to move independently of said coupling arm in a direction tending to close said damper for emergency operation thereof while said coupling arm remains stationary;

condition-sensitive retaining means connected between said operating arm and said coupling arm and opposing said spring means thereby normally restraining movement of

said operating arm independently of said coupling arm, said retaining means being of sufficient strength to transmit forces from said coupling arm to said operating arm in response to rotation of said drive shaft in an opening direction to cause movement of said damper blade means, for controlled opening thereof;

releasing of said retaining means releasing said operating arm to close the damper in an emergency, in response to said spring means;

a drive tab on said coupling arm extending into releasable engagement with said operating arm to interconnect said coupling arm and said operating arm whereby the tab drives the operating arm upon rotation of said drive shaft in a closing direction for closing of said damper by said motor means for controlled operation, and,

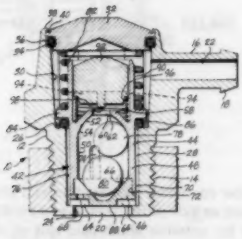
means for mounting said assembly adjacent said damper.

4,487,215

GAS VENTING VALVE

Charles J. Green, Vashon, Wash., assignor to GT Development Corporation, Tukwila, Wash.

Filed Aug. 25, 1983, Ser. No. 526,419
Int. Cl.³ F16K *17/36*
U.S. Cl. 137—43 **15 Claims**



1. A tank vent passageway adapted to permit gas flow but closed to liquid flow, said passageway having a normally lower inlet and a normally upper outlet, and comprising:

wall means defining a spin chamber positioned between said inlet and said outlet, having internal generally circular cross sections;

a circular outlet opening at the upper end of said spin chamber;

a closure ball in said chamber, said ball having a larger diameter than said outlet opening;

at least one sidewall inlet opening into said chamber, tangentially directed with respect to said chamber cross sections, whereby gas flow through said inlet opening and through the spin chamber will spin the closure ball around the chamber, resulting in said closure ball being dynamically influenced away from seating in said outlet opening;

liquid flow responsive means acting on said ball, for lifting said ball to seat on said outlet opening when liquid enters said chamber to a predetermined level, to in that manner close said outlet opening and block liquid flow out through the outlet opening;

a mass on the side of the outlet opening opposite the closure ball;

guide means for said mass, guiding said mass for axial movement towards and away from the outlet opening;

spring means normally positioning said mass into a position spaced away from said closure opening, but permitting the mass to vibrate towards and away from the outlet opening in response to movement of a structure into which the tank vent passageway has been incorporated; and

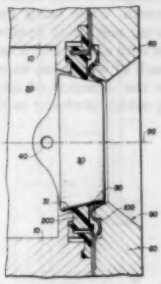
said mass including a center portion positioned to make contact with the closure ball when the closure ball is seated in said outlet opening and the vibration amplitude of the mass exceeds a predetermined amount.

4,487,216

VALVE SEAL FOR FIRE SAFE OR HIGH TEMPERATURE VALVES

James E. Barker, Sauk Rapids, and James C. Hadley, Sartell, both of Minn., assignors to General Signal Corporation, Stamford, Conn.

Filed Aug. 9, 1982, Ser. No. 406,346
Int. Cl.³ F16K *1/228*
U.S. Cl. 137—74 **19 Claims**



10. In a valve having a valve body, a passageway through said valve body, a valving member retained within said passageway and pivotal about an axis transverse to said passageway between an open and a closed position for interrupting fluid flows through said valve in said passageway over a range of different pressures and temperatures across said valve, and a firesafe sealing means for providing a fluid seal between said valving member and said passageway interior surface at normal temperatures and high temperatures, the improvement comprising, in said firesafe sealing means, the combination of:

annular groove means in said passageway disposed in radial alignment with the peripheral sealing surface of said valving member when that valving member is in a closed position;

a first resilient sealing ring, disposed in said groove means and projecting radially inwardly therefrom into said passageway, having a primary sealing surface formed on the inner periphery thereof engagable by the peripheral sealing surface of said valving member; and

a second flexible sealing ring, also disposed in said groove means and projecting radially inwardly therefrom into said passageway, having a cross-sectional configuration including a curvilinear S-shaped cross-section region and an extension from said S-shaped cross-section, said extension retained within said groove means so as to provide cantilever means for said second flexible sealing ring.

4,487,217

REVERSING VALVE FOR COMBINATION METER

Karl Schmidt, Ansbach, Fed. Rep. of Germany, assignor to Hydrometer GmbH, Ansbach, Fed. Rep. of Germany

Filed Jun. 17, 1982, Ser. No. 389,412
Claims priority, application Fed. Rep. of Germany, Jun. 22, 1981, 3124371
Int. Cl.³ F16K *31/12*
U.S. Cl. 137—110 **20 Claims**

1. A reversing valve for a combination meter, said valve being supplied by a main flow from a main meter, and an auxiliary flow from an auxiliary meter, said reversing valve comprising:

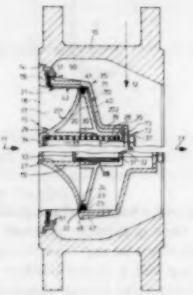
a housing having an inlet opening for said main flow, and receiving said auxiliary flow downstream from said inlet opening for said main flow; said housing also having an outlet for total flow;

a closure element which is movable in the axial direction within said housing;

a hydraulic adjustment member having a working chamber and associated with said closure element;

a bearing disc arranged in said housing at least partially downstream from said inlet opening for said main flow, with radially outwardly directed valve openings for said main flow being provided between said bearing disc and said housing;

a closure ring arranged on said closure element and axially movable therewith, while being guided on said bearing disc, for covering said valve openings; said closure ring being provided with at least one essentially axially extending channel, each of which has an inlet opening which is alway open in the direction of said main flow, and on outlet opening which is closed in the closed position of



said closure element, said outlet opening, however, already after a slight shifting of said closure element in the direction of its open position, being in communication with said working chamber of said adjustment member, with said working chamber being subjected to the pressure of said auxiliary flow at least as long as said at least one channel is closed; and

a spring element associated with said closure element and being effective counter to said main flow, with said closure element being directly affected and adjustable by the pressure of said spring element, by the pressure of said main and auxiliary flows, and from time to time by the variations of volume of said working chamber, said variations of volume being a function of the pressure difference between said main flow and one of said auxiliary and total flows, said main flow being greatly throttled in the last closing phase of said closure element.

4,487,218

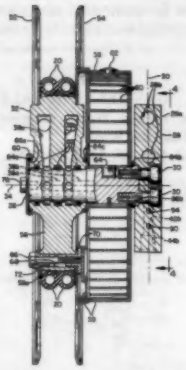
LINE TAKE-UP ASSEMBLY FOR A LIFT TRUCK

Elie C. Sifri, Gresham, Oreg., assignor to Cascade Corporation, Portland, Oreg.

Filed Jun. 25, 1982, Ser. No. 392,362
Int. Cl.³ B65H *75/34*
U.S. Cl. 137—355.26 **15 Claims**

1. In a take-up assembly for a flexible fluid line comprising a journal member having a first fluid passage therein, a line connector mounted on said journal member for rotation about an axis of rotation and having a second fluid passage therein communicating with said first fluid passage so as to form a rotary fluid coupling, said line connector having line attachment means for detachably connecting said fluid line to said line connector, and a reel mounted on said journal member for rotation about said axis of rotation, said reel including respective first and second line-enclosing flanges disposed opposite to and axially spaced from each other and a line-storing hub extending axially between said flanges about which said fluid line is collected in windings, the improvement which comprises respective first and second line-supporting surface means on said hub having axially-extending widths traversing substantially the entire distance between said flanges for supporting said windings of said fluid line, and means detachably connecting said first flange to said line-storing hub for permitting removal of said first flange therefrom while permitting the retention of substantially the entire width of said first line-supporting surface means on said hub, said second line-supporting surface means being located adjacent said line attachment means and being axially removable from said hub and from said first line-supporting surface means upon detachment of said first flange from said hub for facilitating access to said line attachment means.

3. In a take-up assembly for flexible line comprising a journal



member, a line connector mounted on said journal member for rotation about an axis of rotation, a reel mounted on said journal member for rotation about said axis of rotation, said reel including respective first and second line-enclosing flanges disposed opposite to and axially-spaced from each other and a line-storing hub extending axially between said flanges about which said line is collected in windings, and a helical spring assembly mounted against one of said flanges for urging rotation of said line-storing hub, the improvement which comprises a plurality of elongate connectors, each extending through both of said flanges and said line-storing hub and being connected to said helical spring assembly, and each detachably interconnecting each of said flanges, said hub and said helical spring assembly with respect to one another.

4,487,219

FLOOR DRAIN OR SOME OTHER CUPPED WATER SEAL

Paavo Mäkelä, Helsinki; Kalervo Männistö, Vantaa, and Heikki Masalin, Espoo, all of Finland, assignors to Oy All-Plast Ab, Helsinki, Finland

Filed May 9, 1983, Ser. No. 492,941
Claims priority, application Finland, May 13, 1982, 821689
Int. Cl.³ F16L *5/00*; F16K *9/00*
U.S. Cl. 137—362 **2 Claims**

1. A cup-shaped water seal for a floor drain and the like, comprising

a cup-shaped body (1) with a substantially vertical side wall and a bottom wall,

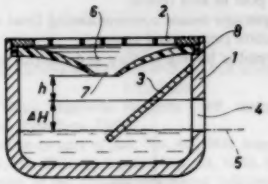
a horizontal trash screen (2) at the top,

an angularly extending water seal forming wall (3) extending downwardly and inwardly from said vertical wall and terminating above said bottom wall,

an outlet (4) through said side wall lying entirely above the lower end of said water seal forming wall and shielded thereby, for connection to a sewer pipe (5),

a funnel-shaped ring (6) below said trash screen (2) having an always-open central hole (7) substantially smaller than

said outlet (4) and located entirely above said outlet (4) and whose outer rim is tightly (8) sealed to said body (1), the rims of the central hole (7) of the funnel-shaped ring



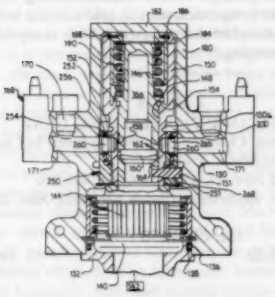
(6) lying no lower than the upper rim of said outlet (4), so that water in said cup-shaped body does not rise above the upper rim of the outlet (4).

4,487,220

FUEL DISTRIBUTION VALVE WITH THERMAL BUFFER MEMBER

Jeffrey B. Hurst, Troy, and Jerome R. Bradley, Sterling Heights, both of Mich., assignors to Ex-Cell-O Corporation, Troy, Mich.

Filed Aug. 12, 1983, Ser. No. 522,443
Int. Cl.³ F16K *11/00*
U.S. Cl. 137—375 **16 Claims**



7. A thermal buffer member useful in a fuel distribution valve assembly, comprising an outer annular lamina made of a material with a relatively high thermal expansion coefficient, an inner annular lamina made of a material with a relatively low thermal expansion coefficient and an intermediate annular lamina between the inner lamina and outer lamina made of a resilient material, said intermediate resilient lamina bonding the inner and outer lamina together so that the thermal buffer member can be inserted or replaced as a unit in a fuel distribution valve assembly.

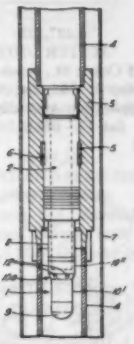
4,487,221

DEVICE FOR TEMPORARILY SEALING A PIPE

Klaas Zwart, The Quay, Newburgh, Aberdeen, Scotland

PCT No. PCT/GB81/00245, § 371 Date Jul. 19, 1982, § 102(e) Date Jul. 19, 1982, PCT Pub. No. WO82/01736, PCT Pub. Date May 27, 1982
PCT Filed Nov. 16, 1981, Ser. No. 403,502
Int. Cl.³ E21B *33/00*; F16L *55/10*
U.S. Cl. 137—508 **9 Claims**

1. A valve device for temporarily sealing a pipe comprising a cylindrical body defining a chamber having a first and second port, said first port being positioned intermediate the axial ends of said chamber, and said second port being positioned at one axial end of said chamber, a piston axially slidable within said cylindrical body, said piston and said cylindrical body co-operating to define an annular passage between them, said passage communicating said first port with said second port when the valve device is open, an annular member arranged within said cylindrical body, said annular member having limited axial movement between two fixed planes perpendicular to the axis of said cylindrical body and being positively restricted in its movement away from a first one of said planes towards the second one of said planes by the adjacent end portion of said piston, said annular member being in sealing



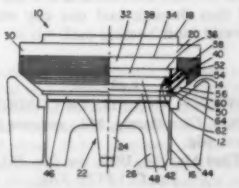
contact with said cylindrical body throughout its axial movement and acting so as to seal said passage when in conjunction with said piston, said piston being movable at least between a first position where said passage is positively sealed by said annular member situated at said first one plane and a second position in which the configuration of said passage is dependent on the displacement of said annular member from said second one plane towards said first one plane, and retaining means for restraining said piston, when in its second position, from moving towards its first position.

4,487,222

POPPET TYPE FLUID VALVE WITH REPLACEABLE WEAR SURFACE

Richard A. Crawford, Gainesville, Tex., assignor to Armco, Inc., Middletown, Ohio

Filed May 3, 1983, Ser. No. 491,282
Int. Cl.³ F16K *15/02*
U.S. Cl. 137—516.29 **2 Claims**



2. A fluid valve, comprising:
(a) a valve seat having a beveled seating surface and a bore opening;
(b) a valve body having an upper valve body portion and a lower valve body portion;
(c) said lower valve body portion including a valve stem and a guide, to be disposed within the valve seat bore;
(d) said upper valve body portion including
(i) a first flange for defining an outer shoulder;
(ii) second and third flanges concentric with one another and with the first flange, and separated apart from each

other, for defining a circumferential groove below and inward of the outer shoulder;

(e) a replaceable valve seating member abutting the outer shoulder and having a beveled surface for engaging the valve seating surface;

(f) a seal disposed within the circumferential groove, for preventing fluid leakage behind the valve seating member; and

(g) means carried on the upper valve body for engaging the valve seating member to maintain it in place.

4,487,223

JETTER UNIT

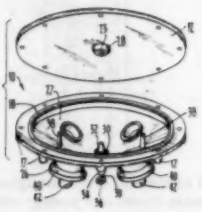
Francis J. Davies, 11 Cedric St., Ivanhoe, Victoria 3, Australia

Filed May 3, 1982, Ser. No. 374,027

Claims priority, application Australia, May 4, 1981, PE8694

Int. Cl.³ B08B 9/02

U.S. Cl. 137—561 R **4 Claims**



1. In a jetter apparatus for washing vacuum-operated teat cup assemblies of a milking machine, said apparatus including a housing comprising separate, interconnected front and back housing parts, said front and back housing parts defining a chamber therebetween, said back housing part including an inlet communicating with the chamber, means to connect said inlet to supply washing liquid thereto, and a plurality of teat cup attachment means connected to said front housing part, the improvement wherein said housing includes a valve means, said valve means comprising a valve stem which extends through said front housing part such that a first end is located within the chamber and a second end is located outside of said housing, said valve stem being adjustably positionable with respect to said front housing part such that the first end thereof is movable within the chamber toward and away from the inlet in said back housing part and thereby controlling the flow of washing liquid through the inlet and into the chamber in said housing and thus through said teat cup attachment means connected to said front housing part.

4,487,224

AIR SWITCH AND FILTER COMBINATION

Oscar E. Parker, Glen Burnie, Md., assignor to Pace Incorporated, Laurel, Md.

Filed Mar. 24, 1982, Ser. No. 361,544

Int. Cl.³ F17D 3/01

U.S. Cl. 137—569 **12 Claims**

1. An air switch for controllably connecting outputs of vacuum and pressure pumps to an output utilization device, said switch connecting either the vacuum output or the pressure output to said output utilization device, said switch controllably varying the pressure to said output utilization device when connecting said pressure output to said utilization device, said switch further comprising means for ensuring that at least one of said vacuum output and said pressure output are vented to the atmosphere either during switching or during variable pressure operation, said switch comprising:

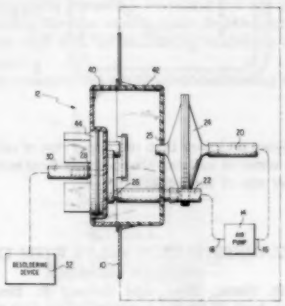
a switch body having vacuum and pressure connection ports;

means defining a recess in said switch body, said recess having a wall;

first body passage means communicating from said vacuum connection port to said recess;

second body passage means communicating from said pressure connection port to said recess;

a switching member having interior and exterior walls, said



interior wall located towards and in said recess, said switching member rotatably receivable in said recess, said switching member exterior wall having an output device connection port located thereon;

a first member passage means communicating from said output device connection port to said interior wall; and

said switching member and said switch body comprising said means for ensuring.

4,487,225

POWER ASSISTED STEERING GEAR

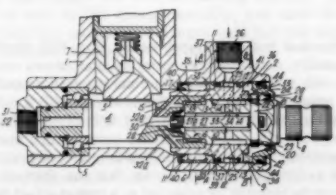
Frederick J. Adams, Clevedon, England, assignor to Cam Gears Limited, Hertfordshire, England

Filed Nov. 17, 1982, Ser. No. 442,246

Claims priority, application United Kingdom, Nov. 18, 1981, 8134712

Int. Cl.³ F15B 9/00

U.S. Cl. 137—625.22 **14 Claims**



1. A power assisted steering gear comprising a housing, an axially rotatable transmission member in the housing, means restraining the transmission member from displacement axially relative to the housing, a valve member in the housing mounted for coaxial rotation with and relative to the transmission member, said valve member having control ports for controlling fluid flow to a power assistance means and an end part extending from a side wall of the housing, said relative rotation being effected in response to a steering input applied to the end part of said valve member for adjusting the control ports of the valve member for controlling fluid flow to the power assistance means, a rigid coupling for restraining the valve member from displacement axially relative to the housing, a bearing supporting said rigid coupling for rotation relative to one of said valve and transmission members and restraining axial displacement of said rigid coupling relative of

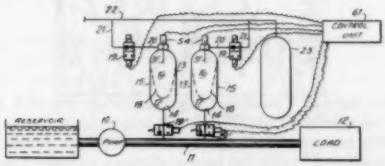
said one of said valve and transmission members, and means connecting said rigid coupling to the other of said valve and transmission members.

4,487,226

FAILURE SENSING HYDRAULIC ACCUMULATOR AND SYSTEM

Hugh H. Chun, Hacienda Heights, Calif., assignor to VSI Corporation, Pasadena, Calif.

Continuation-in-part of Ser. No. 407,564, Aug. 12, 1982, Pat. No. 4,428,401. This application Sep. 21, 1983, Ser. No. 534,321
The portion of the term of this patent subsequent to Jan. 31, 2001, has been disclaimed.
Int. Cl.³ F16L *55/02*
U.S. Cl. 138—30 **2 Claims**



1. A hydraulic accumulator system for operating a hydraulic load, comprising a plurality of pressure vessels each having an oil port, a gas charging port, a bladder assembly disposed in said vessel and dividing the same into gas and oil chambers in communication with said gas and oil ports respectively, a capacitive probe member extending through said gas port into said gas chamber, said probe member being responsive to the presence of liquids and to proximity of said bladder, a gas charging fixture extending from said gas port, a filling orifice leading into said fixture, a first solenoid valve associated with each said filling orifice, a second solenoid valve associated with each said oil port, each said second solenoid valves being adapted to be connected to such hydraulic load, a gas reservoir, conduit means leading from said reservoir to said first solenoid valves, normally to couple said filling orifices and hence said gas chambers to said reservoir, said second solenoid valves being adapted to be interposed between said oil ports and said hydraulic load, and control means operatively connected to said valves and said probe for shifting said valves to decouple said gas ports from said reservoir, and said oil ports from such hydraulic load, responsive to a predetermined capacitive change sensed by said probe.

4,487,227

SPACING INSERT FOR CONCENTRIC FILTER ELEMENTS

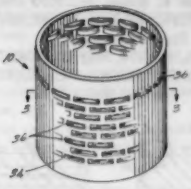
Paul J. Meissner, Sun Valley, Calif., assignor to Meissner Manufacturing Company, Sun Valley, Calif.

Continuation of Ser. No. 288,339, Jul. 31, 1981, abandoned, which is a continuation-in-part of Ser. No. 160,906, Jun. 18, 1980, Pat. No. 4,317,727. This application Mar. 19, 1984, Ser. No. 590,560
Int. Cl.³ F15D *1/02*
U.S. Cl. 138—37 **7 Claims**

1. An insert adapted to be placed concentric cylindrical filer elements, the insert consisting essentially of a single walled construction which comprises:

a tubular cylindrical body; and

a plurality of cuts in the body, each forming a flap connected to the remainder of the body and permanently deformed so as to form a protrusion extending transversely from the remainder of the body and an aperture in the remainder of the body, the flaps being uniformly arranged in staggered generally circumferential rows, and wherein the lengths of the flaps are greater than the distance between circumferentially adjacent flaps such that each flap in one row overlaps two flaps in each axially adjacent row.

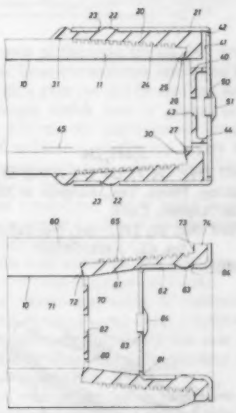


4,487,228

WEATHER-RESISTANT AND SELF-DRAINING THREAD PROTECTOR

David T. Waldo, Kingwood, Tex.; James L. Peterson, Gretna, and William D. Grimes, Harvey, both of La., assignors to Shell Oil Company and Shell Offshore Inc., both of Houston, Tex.

Filed Dec. 19, 1983, Ser. No. 562,548
Int. Cl.³ F16L *55/10*
U.S. Cl. 138—96 T **12 Claims**



1. A protector for the threads on a tubular member comprising:

a first cylindrical cup-shaped plastic member, one surface of the cylindrical wall of said first cup-shaped member being formed to conform to the thread surface of the tubular member, said cup-shaped member, in addition, having a plurality of drain holes disposed in the bottom wall thereof, a portion of the outer surface of each of said drain holes being aligned with the inner surface of said tubular member for draining the interior of said tubular member;

a second cylindrical cup-shaped member, said second cup-shaped member being formed of metal and shaped to conform to the other of the cylindrical surfaces of the first cup-shaped member, said second cup-shaped member having a plurality of openings formed in the bottom wall that communicate with the drain holes in said first cup-shaped member; and

bosses formed on said cylindrical surface, said bosses being aligned with openings formed in the cylindrical wall of said second cup-shaped member whereby said first cup-shaped member is retained in said second cup-shaped member.

4,487,229

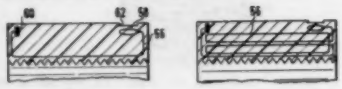
SYSTEM FOR PROTECTING MACHINE THREADS

Wilfried Dreyfuss, Dorfstrasse 52, D-3111 Eimke, Fed. Rep. of Germany; Thomas E. Remp, Jr., 5555 Del Monte Dr. T-2, Houston, Tex. 77056, and Kurt Muller, Muhlenweg 58, 3101 Eicklingen, Fed. Rep. of Germany

Division of Ser. No. 364,474, Mar. 31, 1982,. This application Jun. 13, 1983, Ser. No. 503,419

Int. Cl.³ B65D *59/00*

U.S. Cl. 138—96 T 11 Claims



1. A guard for protecting threads on an end of a pipe comprising, in combination:

a base of elastomeric material about said threads;

tear-off means for facilitating removal of said base, said tear-off means including a wire embedded in said elastomeric material, said wire including a tear-off lug embedded in a predetermined location within said elastomeric material of said base; and

marking means, on said base, for indicating said predetermined location of said tear-off lug.

4,487,230

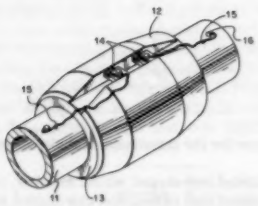
INCREASING THE OUTPUT OF A PIPELINE ANODE

Donald R. Anthony, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 10, 1981, Ser. No. 329,498

Int. Cl.³ F16L *58/00*

U.S. Cl. 138—103 6 Claims



1. In combination with an iron tubular member located in an earthen environment and through which fluids above 100° F. are to be transported a cathodic protection anode system consisting essentially of: a sacrificial anode selected from the group consisting of aluminum, zinc, or alloys of aluminum, alloys of zinc, or mixtures thereof, said anode being adapted to cause ions to flow into said environment and adapted to be placed near and encircle a substantial portion of the outer surface of said tubular member; a thermal insulating material located between the outer surface of said tubular member and said anode to insulate said anode so that the temperature of said anode stays closer to the temperature of said environment than to the temperature of the fluids transported through said tubular member; and means electrically connecting said anode to said tubular member.

4,487,231

SHIRRED TUBULAR CASING AND APPARATUS INCLUDING SHIRRING MEMBER FOR ITS MANUFACTURE

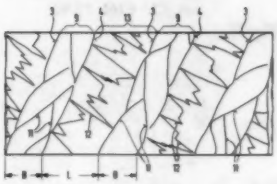
Hans Wolf, Ingelheim, and Richard Lenhart, Wiesbaden, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

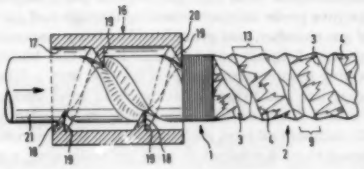
Filed Aug. 5, 1983, Ser. No. 520,540

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1982, 3230358

Int. Cl.³ F16L *11/10*

U.S. Cl. 138—118.1 6 Claims





1. A shirred tubular casing, comprising:

a main fold structure comprising a series of windings, each winding including:

two helically extending, outwardly pointing main folds in proximate relation to one another and having a height H measured as one-half of the difference between the outside and inside diameters of the casing,

a first interspace between said two main folds defining first fold pockets therebetween, said first fold pockets having a depth less than the height H,

a second interspace between successive windings of said main fold structure, having a width equal to or greater than said first interspace and defining second fold pockets therebetween, said second fold pockets having a depth substantially equal to H and forming the inner circumference of the casing, and

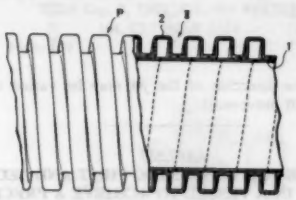
a plurality of outwardly pointing primary accessory folds in said first interspace, said primary accessory folds connecting with said main folds and interconnecting to at least some extent with one another; and

a plurality of secondary accessory folds in said second interspace forming an irregular zigzag line, wherein the surfaces of the shirred casing extending from said outwardly pointing main folds and from said accessory folds in the direction of the inner circumference extend at substantially right angles to the longitudinal axis of the shirred casing.

4,487,232
DOUBLED-WALLED CORRUGATED SYNTHETIC RESIN PIPE

Shiro Kanao, No. 9-18, Nanpeidai 4-chome, Takatsuki-shi, Osaka, Japan

Filed Jun. 21, 1982, Ser. No. 390,607
Claims priority, application Japan, Sep. 18, 1981, 56-139647[U]
Int. Cl.³ F16L *11/11*
U.S. Cl. 138—122 **8 Claims**

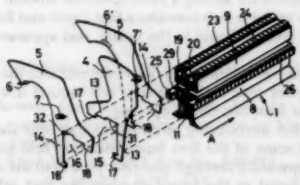


1. A double-walled corrugated synthetic resin pipe, comprising; a straight inner pipe and a corrugated outer pipe surrounding said inner pipe and joined integrally thereto, said inner pipe being formed by a spirally wound flat strip of a synthetic resin material having adjacent turns thereof joined to each other along adjoining edges thereof, said inner pipe having an outer surface, said outer pipe being formed by a spirally wound corrugated synthetic resin strip having adjacent turns thereof joined to each other along adjoining edges thereof, said strip defining said outer pipe having a corrugation defined by a ridge portion, a pair of groove portions and intermediate portions therebetween, said groove portions each having a flat inner surface joined to said outer surface of said inner pipe and wherein said synthetic resin strips are formed of extruded polymers, such that, when assembled, the molecular structure of said polymers is oriented spirally with respect to an axis of said pipe, thereby increasing the circumferential strength of said pipe.

4,487,233
MULTIPLE LONGITUDINAL TRAVERSING SHED WEAVING LOOM

Alois Steiner, Rieden, Switzerland, assignor to Maschinenfabrik Sulzer-Rüti AG, Rüti, Switzerland

Filed Apr. 11, 1983, Ser. No. 483,526
Claims priority, application Switzerland, Apr. 28, 1982, 2588/82
Int. Cl.³ D03D *47/00*; D03C *13/00*
U.S. Cl. 139—28 **8 Claims**



1. A multiple longitudinal traversing shed weaving loom comprising:

a weaving rotor;

shed-retaining elements provided for said weaving rotor for holding warp threads over a predetermined path in selective upper and lower shed positions;

control means arranged forwardly of said weaving rotor with respect to a predetermined direction of travel of said warp threads;

said control means serving for the lateral deflection and allocation of each warp thread to a respective one of said shed-retaining elements determining either an upper shed or a lower shed;

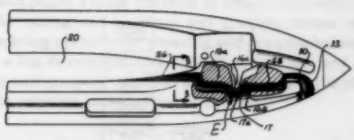
said control means comprising shedding rods constituted by first racks extending in a predetermined weft direction and being displaceable through an adjustable stroke in said weft direction; and

each of said first racks having rack teeth and tooth spaces therebetween which serve as guiding means for said warp threads.

4,487,234
REINFORCED LOOM SHUTTLE AND METHOD

Robert E. Maclay, Taylors, S.C., assignor to Steel Heddle Manufacturing Co., Greenville, S.C.

Filed Apr. 5, 1982, Ser. No. 365,549
Int. Cl.³ D03J *5/02*
U.S. Cl. 139—196.1 **9 Claims**



1. A loom shuttle of the type having first and second side walls constructed from conventional laminated layers of resin impregnated fabric a yarn eye slot formed in a first side wall of said shuttle through which yarn is guided and withdrawn during weaving wherein the improvement comprises:

a plurality of additional reinforcing layers of reinforcing fabric laminated with said conventional laminated layers of conventional fabric;

said additional reinforcing layers being included and oriented only in said first side wall laminated with said conventional laminated layers;

said second side wall including only said conventional laminated layers of resin impregnated fabric;

said additional reinforcing layers of reinforcing fabric including synthetic reinforcing fibers extending height wise in the direction of height of said first side wall having a strength greater than the corresponding fibers of said conventional layers; and

said additional reinforcing layers being oriented across a section of said yarn eye slot in said first side wall with said height wise extending synthetic reinforcing fibers reinforcing the tensile strength of said first wall in the height direction of said side wall;

whereby splitting of said first side wall in the area of said eye slot is reduced.

4,487,235
METHOD OF AND APPARATUS FOR DETECTING WEFT YARN IN JET LOOMS

Katsuhiko Sugita, and Tsutomu Sainen, both of Kanazawa, Japan, assignors to Tsudakoma Corp., Ishikawa, Japan

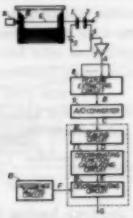
Filed May 24, 1983, Ser. No. 497,524
Claims priority, application Japan, May 31, 1982, 57-092467
Int. Cl.³ D03D *51/18*
U.S. Cl. 139—370.2 **17 Claims**

1. A method of detecting a weft yarn inserted through a warp shed in a jet loom by a jet of fluid, comprising the steps of:

(a) providing sensor means responsive to the presence of a weft yarn and responsive to the presence of a jet of fluid in the warp shed for producing a signal;

(b) extracting from said signal plural characteristic parameters thereof, including characteristic parameters representative of frequency components generated by a weft yarn and by a jet of fluid;
(c) calculating normalized signals from said characteristic parameters;
(d) calculating a discriminating function from a combination of said normalized signals; and
(e) comparing said discriminating function with a reference signal.

12. An apparatus for detecting a weft yarn inserted by a jet of fluid through a warp shed in a jet loom, comprising:
(a) nozzle means for ejecting a jet of fluid to insert a weft yarn through said warp shed;
(b) a pair of spaced sensors provided on a side of said warp shed opposite from said nozzle means and means responsive to said sensors for producing an electric signal;
(c) amplifier means for amplifying said electric signal;



(d) extracting means responsive to said amplifier means for extracting from said electric signal plural characteristic parameters thereof, including characteristic parameters respresentative of frequency components generated by a weft yarn and by a jet of fluid;
(e) scaling means responsive to said extracting means for normalizing amplitudes of said characteristic parameters;
(f) discriminating function calculating means responsive to said scaling means for calculating a discriminating function from a combination of said normalized characteristic parameters;
(g) reference setting means for providing a predetermined reference; and
(h) discriminating means responsive to said reference setting means and to said discriminating function calculating means for comparing said discriminating function derived from said electric signal to said predetermined reference, and for producing an output signal in response to said comparison which indicates whether a weft yarn is present in the region of said electrodes.

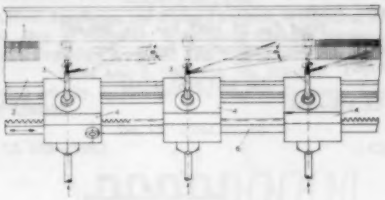
4,487,236

PNEUMATIC WEAVING MACHINE

Paul Gunneman, Mierlo, Netherlands, assignor to Ruti-Te Strake B.V., Deurne, Netherlands

Continuation-in-part of Ser. No. 183,265, Sep. 2, 1980, abandoned. This application Dec. 17, 1982, Ser. No. 450,680
Claims priority, application Netherlands, Sep. 21, 1979, 7907050
Int. Cl.³ D03D *47/30*
U.S. Cl. 139—435 **5 Claims**

1. A pneumatic weaving machine comprising a reed composed of contoured lamellae jointly delimiting a guide channel which is open on the side facing the beating-up line, a main blowing nozzle positioned to direct an air jet into one end of said channel, and a plurality of auxiliary blowing nozzles having blowing apertures directed into said channel through the open side thereof, characterized in that means are provided for varying the jet produced by at least one of said auxiliary blowing nozzles to vary the amount of the component of said jet that is transverse to said channel, said means being of such a



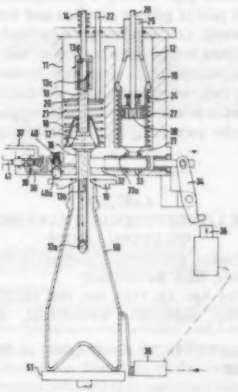
nature that the direction of the jet may be varied thereby during the weft movement.

4,487,237

APPARATUS FOR COMBINING FIRST AND SECOND LIQUIDS IN A VESSEL TO ACHIEVE A PRECISE DOSAGE OF THE SECOND LIQUID AND A PRECISE FINAL HEIGHT OF THE COMBINED LIQUIDS

Peter Sick, Ahlenbachweg 21a, D-7804 Glottertal, Fed. Rep. of Germany, and Joseph Menini, 27, Rue de La Melenne, F-25230 Seloncourt, France

Filed Jan. 21, 1983, Ser. No. 459,974
Claims priority, application Fed. Rep. of Germany, Jan. 28, 1982, 3202655
Int. Cl.³ B65B *31/00, 3/26*
U.S. Cl. 141—39 **7 Claims**



1. Apparatus for adding a predetermined amount of a second liquid to a vessel which contains a first liquid and for achieving a final fill level of liquid in the vessel, said apparatus comprising:
a riser pipe projecting into the vessel and into the first liquid, said riser pipe including first and second inlet openings, and at least one outlet opening;
means for introducing pressurized gas into the vessel to expel some of the first liquid into said first inlet opening and upwardly through said riser pipe until the level of said first liquid in the vessel reaches the first inlet opening whereupon further expulsion of said first liquid automatically ceases;
a collector container communicating with said first outlet for receiving the expelled first liquid;
means for introducing the predetermined amount of second liquid into the vessel; and
means for communicating the collector container with the vessel to conduct first liquid back into the vessel, with air

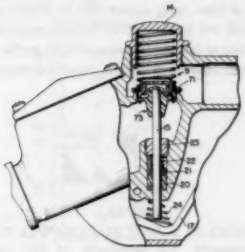
being evacuated from the vessel through the second inlet opening until liquid in the vessel covers the second inlet opening, whereupon further entry of first liquid into the vessel ceases.

4,487,238

NOZZLE HAVING IMPROVED LOW FLOW CHARACTERISTICS AND POPPET THEREFOR

Mervin L. Carder, Sr., Fenton, Mo., assignor to M. Carder Industries, Inc., Fenton, Mo.

Filed Sep. 9, 1982, Ser. No. 416,299
Int. Cl.³ B65B *3/26*
U.S. Cl. 141—206 **20 Claims**



1. A dispensing nozzle for gasoline or the like including a casing having an inlet, an outlet spout, a fluid passage therebetween, and a valve seat in the fluid passage, a poppet valve assembly cooperative with the valve seat for closing the fluid passage, biasing means for biasing the poppet valve assembly to a closed position, a valve stem depending from the poppet valve assembly, a manually operable lever cooperative with the valve stem for opening the poppet valve assembly against the bias of the biasing means, and automatic shut-off means for disabling the manually operable lever, characterized in that the poppet valve assembly includes an upper part and a mating lower part extending into the upper part, the upper part comprising a sealing disk, means for holding the sealing disk for cooperation with the seat to close the fluid passage, means cooperative with the biasing means for urging the sealing disk into cooperation with the seat, a depending skirt tapered to form an increasingly large flow passage through said valve seat as said valve assembly is lifted, and an upwardly, extending central cavity in the lower face of the upper part, the lower part comprising a central button extending into the central cavity of the upper part and a central socket for receiving an upper end of the valve stem, the cavity and the button being constructed to lift the upper part at an angle with respect to the plane normal to the stem, so as to lift one side of the sealing disk from the valve seat before the other side of the sealing disk is lifted.

4,487,239

HYDRAULIC WOOD SPLITTER WITH AUTOMATIC CABLE HOIST

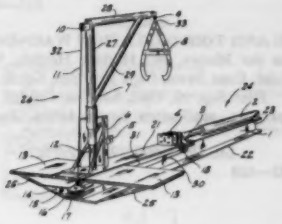
Elga Anderson, deceased, Centertown, Mo. by Margaret Anderson, personal representative, assignor to Margaret A. Anderson, Centertown, Mo.

Filed May 24, 1982, Ser. No. 330,093
Int. Cl.³ B27L *7/00*
U.S. Cl. 144—193 A **6 Claims**

1. A hydraulic wood splitter with an automatic hoist for lifting logs onto the splitter, the splitter including a platform for supporting a log thereon in generally horizontal position, a splitting wedge adjacent one end constituting the front end of the platform, and an extensible and retractible hydraulic ram on the platform spaced rearwardly from the splitting wedge for placement of a log lengthwise between the ram and the splitting wedge, said ram being extensible for pushing said log against said splitting wedge to split the log and retractible for placement of another log on the platform, said hoist comprising:

a boom extending up from the platform generally forward of said splitting wedge, said boom being pivoted on the platform on a generally vertical axis;

means supported by the boom for grasping a log to be split; and



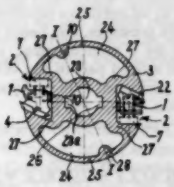
a cable and pulley system operable in conjunction with the ram for raising and lowering said grasping means, said system being operable for lowering said grasping means to grasp a log in response to extension of said ram and for raising said grasping means to hoist the log onto the platform in response to retraction of the ram.

4,487,240

BLADE HOLDING MEANS FOR CUTTER SPINDLES OR CUTTER HEADS

Otto Bergler, Mühlacker-Lomersheim, Fed. Rep. of Germany, assignor to Eugen Lutz GmbH & Co Maschinenfabrik, Fed. Rep. of Germany

Filed Mar. 9, 1981, Ser. No. 241,730
Claims priority, application Fed. Rep. of Germany, Mar. 8, 1980, 8006414[U]; Mar. 8, 1980, 8006415[U]
Int. Cl.³ B27G *13/00*
U.S. Cl. 144—230 **9 Claims**



1. A blade holding means for a cutter head having a rotating axis and having a reversible blade, comprising-

a radially adjustable blade holder, in the shape of drawn profile sections,

means for radially adjusting the blade holder with respect to the axis, and

means to move the blade holder laterally to secure a blade to the cutter head,

two spaced apart blade supporting surfaces on said blade holder,

a reinforcement projection on the blade holder projecting beyond said blade supporting surfaces for locating a blade,

a groove between said blade supporting surfaces adjacent to the reinforcement projection that is radially closer to the axis than the projection and parallel to said axis for receiving means to position a smaller blade wherein

either

(a) a holding plate means having a guide which is inserted into the groove, a second guide rib on the holding plate

means for locating a small cutting blade on one of said supporting surfaces, or

(b) a large cutting blade having a recess which engages the reinforcement projection said large cutting blade engaging the spaced apart blade supporting surfaces, one located radially closer to the axis with respect to the groove and the second radially more remote from the axis with respect to the reinforcement projection.

4,487,241

PUMPING AND TIRE DEFLATION WARNING SYSTEM

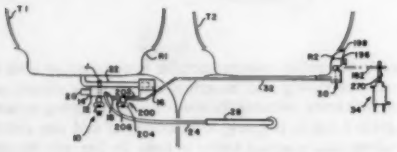
Izak F. van der Merwe, 402 Hillside Heights, Wessels Rd., Green Point, Cape Town, Cape Province, South Africa

Filed Sep. 20, 1982, Ser. No. 420,165

Claims priority, application South Africa, Jan. 15, 1982, 82/0275

Int. Cl.[3] **B60C** *29/00, 23/02*

U.S. Cl. 152—428 **10 Claims**



1. A pumping and tire deflation warning system for a pair of dual wheels, the system comprising a device mounted on the wheels, the device including a body having an inlet for connection to an air line and two outlets respectively connected to the tires of the pair of wheels, an element within the body and subjected to a first force which is derived from the pressure in one tire and a second force which opposes the first force and which is derived from the pressure in the other tire, the element being moved by either one of said forces when that force exceeds the other by a predetermined amount, a trigger unit mounted on the rim of the inner wheel, the trigger unit including an arm which is normally held in an inoperative position, a mechanical link between said element and said trigger unit for releasing said arm to its operative position when said element moves upon the tire pressures, and hence said forces, varying from one another by a predetermined amount, and switch means mounted on a fixed part of the vehicle and having an operating member positioned to be hit by said arm when it is in its operative position.

4,487,242

VERTICALLY SLIDABLE WINDOW

Akira Fujitsuka, Amagasaki, Japan, assignor to Alna Koki Co., Ltd., Amagasaki, Japan

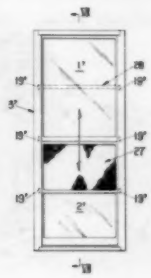
Filed Mar. 23, 1981, Ser. No. 239,188

Claims priority, application Japan, Mar. 12, 1980, 55-33008; Mar. 12, 1980, 55-33009

Int. Cl.[3] **E06B** *3/44;* **E05F** *17/00*

U.S. Cl. 160—102 **1 Claim**

1. A vertically slidable window for covering a window opening when the window is closed, said window having upper and lower sashes which open and close the window opening, said upper and lower sashes each being provided with vertical side members having rack members positioned therein in opposed relationship to a rack member on the other sash; at least three pinions interposed between said opposed rack members, said pinions meshing into said opposed rack members, an outer window frame on which said slidable window is mounted, said pinions being arranged at suitable intervals in the direction of the side walls of the outer window frame and supported in the outer window frame, the lower portion of said upper sash and the upper portion of said lower sash each having attached thereto a window screen member, each of said window screen members being adapted to move integrally with the sash to which it is attached when said sash is moved upwardly or downwardly, the height of each of said window screen members being about a half the height of the sash to which it is attached, said window screen members being removably attached to their associated sashes by means of a locking arrangement comprising a locking groove cut in the horizontal member of said screen member adjacent to its associated sash member, said locking groove being enlarged at at least one point to receive a locking element, said locking element being attached to and extending away from the margin of said sash member adjacent to its associated screen member, said locking element being adapted to be inserted into the enlargement of said groove, whereby said screen member may



be attached to its associated sash member by inserting said locking element in said groove enlargement and moving said screen member and associated sash member laterally with respect to each other, said slidable window being provided with guide bushings which are in contact with the said frames of the outer window frame for vertically guiding the upper and lower sashes, said bushings being attached to the vertical frames of the upper and lower sashes, said window screen members being provided with keep elements of substantially trapezoidal shape having a tapered surface which are in contact with the side frames of the outer window frame for vertically guiding the window screens, said keep elements being attached to the side frames of each of said window screens.

4,487,243

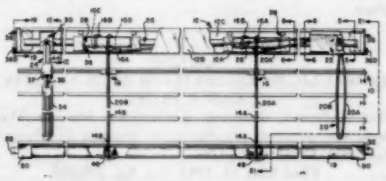
VENETIAN BLIND

Victor Debs, Staten Island, N.Y., assignor to Levolor Lorentzen, Inc., Lyndhurst, N.J.

Filed May 21, 1982, Ser. No. 380,947

Int. Cl.[3] **E06B** *9/30*

U.S. Cl. 160—168R **2 Claims**



1. A venetian blind having a head channel with side walls and flanges extending inwardly from said side walls, a plurality of slats, means provided in said head channel for suspending said slats from said head channel, means provided in said head channel for lifting and lowering said slats, and means associated with said head channel for tilting said slats from essentially horizontal positions to tilted positions and vice versa, said tilting means including: a housing placed in said head channel,

said housing being a unitary molded piece of plastic open at the top and having a bottom wall, and a side wall having a portion inclined at an angle with respect to said bottom wall, a worm gear inserted into said housing from said top and rotatably supported in said housing, a tilt rod extending through said worm gear and rotatably mounted in said head channel and held in fixed rotational relationship thereto, and a worm shaft inserted into said housing from the top and supported by said side wall portion and having a worm in meshing engagement with said worm gear, said worm shaft being provided with a groove extending essentially longitudinally over the entire length thereof, said groove permitting said worm shaft to be inserted from the top of said housing by accommodating the teeth of said gear during insertion until the teeth of the worm mesh with the teeth of the worm gear, and a separate cover placed on said open top of said housing for holding said gear shaft in place when said housing is placed in said head and said cover is clamped between said top of said housing and said flanges.

4,487,244

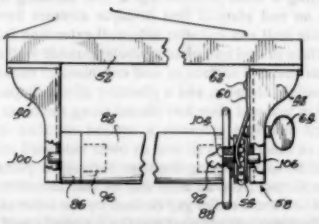
ROLLER APPARATUS FOR A FLEXIBLE WEB

Carl G. Olson, 705 N. Elmhurst Rd., Prospect Heights, Ill. 60070

Continuation-in-part of Ser. No. 262,529, May 11, 1981,. This application Sep. 8, 1981, Ser. No. 300,165

Int. Cl.³ A47G *5/02*

U.S. Cl. 160—283 **15 Claims**



1. A roller apparatus for a flexible web such as a chart, said flexible web being provided on at least one free margin thereof with an elongated web mounting means of predetermined cross-sectional dimensions which are greater than the thickness of said flexible webbing material, said roller apparatus comprising: rigid, elongated tubular roll means for receiving and mounting said web mounting means interiorly thereof and including in a peripheral wall portion thereof a longitudinal through slot of a cross-sectional dimension smaller than that of said web mounting means and greater than the thickness of said web, an end cap mountable to either end of said tubular roll means, means removably mounting at least one of said end caps to said tubular roll means and including releasable telescopic engagement means between said one end cap and an adjacent end portion of the tubular roll means independent of the interior mounting of the web mounting means to provide for rotation of said one end cap in unison with the tubular roll means when assembled and, upon removal of said one end up, for permitting slidable insertion of said web mounting means with said flexible webbing affixed thereto into said tubular roll means with said flexible webbing depending through and below said longitudinal slot, whereby said web mounting means and said flexible webbing depending therefrom are slidably insertable into the tubular roll means selectively from either right-hand or left-hand margins of said flexible webbing so as to selectively reveal either surface of said flexible webbing with respect to a fixed observer.

4,487,245

TORQUE-ADJUSTING DEVICE FOR USE IN A ROLLER BLIND

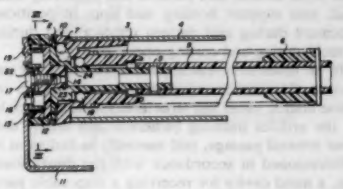
Kazuo Shinohara, and Yoshihiro Shoji, both of Tokyo, Japan, assignors to Toso Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 11, 1981, Ser. No. 291,949

Claims priority, application Japan, Aug. 29, 1980, 55-121907[U]

Int. Cl.³ A47G *5/02*

U.S. Cl. 160—313 **4 Claims**



1. A torque-adjusting device for use in a roller blind provided with a spring-motor having one end thereof secured to an elongated end of a stator and the other end fixed to a rotator integral with a hollow roller on which a screen is wound, said device comprising:

a hollow brake drum adapted to be secured to a mounting bracket;

a brake coil spring operatively fitted on said brake drum and including opposite ends;

an intermediate disk fitted on said brake coil spring and operatively coupled with said stator for rotation therewith;

a slit positioned in an outer periphery of said intermediate disk;

said brake coil spring having the opposite ends thereof projecting radially outwardly and inserted into the slit in the outer periphery of said intermediate disk; and

a handle ring operatively fitted on said intermediate disk and formed with an inner radial tongue inserted between the opposite ends of said slit;

whereby said brake coil spring permits said stator to be selectively rotated by said handle ring for adjustment of the torque of said spring-motor but prevents said stator from being rotated by said spring-motor.

4,487,246

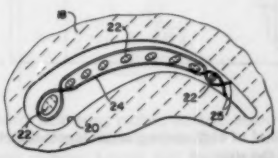
SYSTEM FOR LOCATING CORES IN CASTING MOLDS

Donald J. Frasier, Whitehall, Mich., assignor to Howmet Turbine Components Corporation, Greenwich, Conn.

Filed Apr. 12, 1982, Ser. No. 367,270

Int. Cl.³ B22D *33/04*

U.S. Cl. 164—32 **15 Claims**



1. In a method for investment casting of metal articles from the group consisting of turbine blades, vanes, and structures including such blades or vanes, the articles defining (producing a cast metal article which defines) at least one internal passage, said method comprising the steps of providing at least one core dimensioned in accordance with the dimensions of said passage, confining the core within a disposable pattern, forming a

ceramic mold around the pattern whereby, when the pattern material is removed, a mold cavity is provided with the core positioned in the cavity, curing said mold, and casting metal into the cavity to form said article with said passage defined therein, the improvement comprising the steps of providing a support for said core, said support having at least one dimension corresponding with a desired wall thickness of the cast article, positioning said support on said core surface, thereafter forming said pattern material around said core to wholly contain said support within said pattern material, forming said ceramic mold around said pattern, and removing said pattern material, said support holding said core in position against displacement during said pattern removal and during subsequent mold curing and casting operations.

10. In an investment casting mold assembly for use in the production of (a) cast metal articles from the group consisting of turbine blades, vanes and structures including such blades or vanes, the articles defining (wherein said article defines) at least one internal passage, said assembly including at least one core dimensioned in accordance with the dimensions of said passage, a mold cavity for receiving a disposable pattern surrounding said core, (and) said cavity being defined by a ceramic mold formed around the pattern whereby, when the pattern material is removed, (a) the mold cavity is provided with the core positioned in the cavity, the improvement comprising a support for supporting said core within said cavity during pattern removal and during subsequent mold curing and casting operations, said support having at least one dimension corresponding with a desired wall thickness of the cast article, said support being positioned on said core surface during forming of said pattern material around said core whereby the support is wholly contained within said (pattern material) mold cavity after the pattern material has been removed, there being no portion of the support extending into the ceramic mold.

4,487,247

CHILL CASTING METHODS

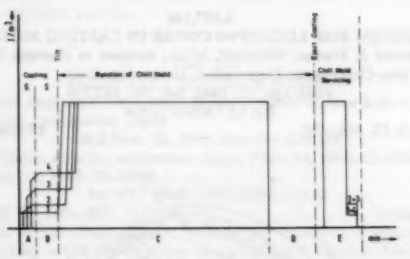
Heinrich Faste, Grossenkneten, and Ali Bindernagel, Wermelskirchen, both of Fed. Rep. of Germany, assignors to Kocks Technik GmbH & Co., Hilden, Fed. Rep. of Germany

Filed Jul. 30, 1982, Ser. No. 403,354

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1981, 3134699

Int. Cl.³ B22D *27/04*

U.S. Cl. 164—126 **3 Claims**



1. A method of chill casting metal ingots, billets or the like comprising the steps of:

(a) pouring a metal to be cast into a thin walled chill mould;

(b) separately subjecting vertical increments of said chill mould to coolant during pouring whereby the bottommost portion is cooled first upon commencement of pouring with moderate cooling intensity, and the portions located thereabove being successively subsequently cooled at successive intervals of time with increasing intensity of cooling up to a maximum intensity of cooling at the top;

(c) subjecting the entire mould to the same high intensity cooling as soon as the pouring step is completed

(d) discontinuing cooling shortly before complete solidification of the mould contents, and

(e) completely solidifying the mould contents and ejecting the formed solidified product.

4,487,248

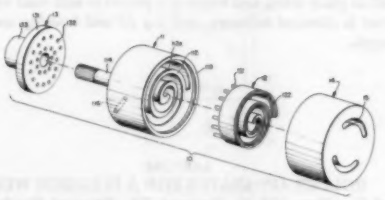
SCROLL MANUFACTURING METHOD AND TOOL

Eiji Fukushima, Fujimi; Seiichi Fukuhara, Takasaki, and Masaharu Hiraga, Honjo, all of Japan, assignors to Sanden Corporation, Gunma, Japan

Filed Jul. 23, 1982, Ser. No. 401,221

Int. Cl.³ B22D *33/04*

U.S. Cl. 164—131 **8 Claims**



1. A method for manufacturing a scroll for use in a scroll type fluid displacement apparatus, said scroll being formed by a spiral element and an end plate, the method comprising the steps of:

(a) providing a mold comprising: a first molding member having an end plate, a first involute element having an inner side wall and an outer side wall extending from one end surface of said end plate a tubular outside wall extending from one end surface of said end plate to enclose said first involute element, and a plurality of arc shaped holes formed in said end plate and placed along the outer side of said first involute element; a second involute element having an inner side wall and an outer side wall rotatably coupled to said molding member through a plurality of pins projecting from an axial end of said second involute element to form a radial gap defined by the inner side wall of said first involute element and the outer side wall of said second involute element; and a rotatable member disposed along the end surface of said end plate and coupled to said pins to transmit the rotation thereof to said second involute element;

(b) filling said radial gap with molten metal and allowing the molten metal to solidify;

(c) rotating said second involute element via said rotatable member to enlarge said radial gap; and

(d) removing the solidified metal which has been formed into the shape of a spiral element from said radial gap.

5. A manufacturing tool for making a scroll for use in a scroll type fluid displacement apparatus, said scroll being formed by a spiral element and an end plate, said tool comprising:

(a) a first molding member having an end plate, a first involute element having an inner side wall and an outer side wall extending from one end surface of said end plate, a tubular outside wall extending from one end surface of said end plate to enclose said first involute element, and a plurality of arc shaped holes formed through said end plate and placed along the outer side of said first involute element;

(b) a second involute element having an inner side wall and an outer side wall rotatably coupled to said first molding member and interfitting with said first involute element in a disposition to define a radial gap between the inner side wall of said first involute element and the outer side wall of said second involute element, said second involute element having a plurality of pins projecting axially from

an axial end of said second involute element and penetrating through said arc shaped holes in said end plate of said first molding member;

(c) a rotatable member having a plurality of holes extending in the axial direction, said pins of said second involute element having axial end portions extending into said holes in said rotatable member to couple said rotatable member to said second involute element and to transmit the rotation of said rotatable member to said second involute element so that the relative rotation between said first and second involute elements adjusts the size of said radial gap; and

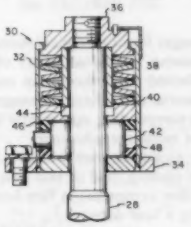
(d) a second molding member having an indentation in its axial end surface facing said first and second involute elements, said second molding member being attachable to said first molding member during the manufacturing process to define a space within which the end plate of the scroll is formed.

4,487,249

METHOD AND APPARATUS FOR ADJUSTING THE SIZE OF A CONTINUOUS CASTING MOLD

Wilmer C. Wrhen, Venango County, Cranberry Township, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Oct. 18, 1982, Ser. No. 434,773
Int. Cl.³ B22D *11/16*
U.S. Cl. 164—452 **4 Claims**



1. In a method of adjusting the size of a continuous casting mold, said method including relieving the clamping force exerted on the sidewalls of said mold, after relief of the clamping force, adjusting the spacing between opposed sidewalls of said mold, and reimposing the clamping force on the sidewalls of said mold,

the improvement in said method which comprises:

measuring the clamping force exerted on the sidewalls of the mold during the continuous casting operation, and

adjusting the clamping force imposed on the sidewalls of the mold during the continuous casting operation to a predetermined value, said value being dependent upon the spacing to which the opposed sidewalls of said mold are adjusted.

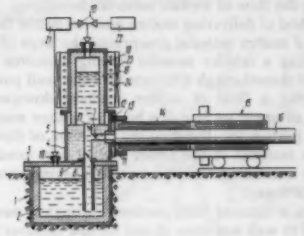
4,487,250

CONTINUOUS CASTING PROCESS AND APPARATUS

Evgeny A. Korshunov, pereulok Otdelny, 5a, kv. 29, Sverdlovsk; Alexandr N. Kuznetsov, prospekt Mira, 118, kv. 49, Krasnoyarsk; Maxim B. Ovodenko, ulitsa Gorkogo, 19, kv. 5, Krasnoyarsk; Gennady G. Kuzmin, ulitsa Lebedevoi, 147a, kv. 9, Krasnoyarsk; Valery P. Kostrov, ulitsa Bazhova, 57, kv. 10, Sverdlovsk; Alexandr N. Timofeev, ulitsa Kachinskaya, 60a, kv. 3, Krasnoyarsk; Valery L. Bastrikov, ulitsa Kommunisticheskaya, 83, kv. 63, and Tatyana V. Meschaninova, ulitsa Malysheva, 127a, kv. 21, both of Sverdlovsk, all of U.S.S.R.

Filed Apr. 13, 1982, Ser. No. 367,994
Int. Cl.³ B22D *11/10*
U.S. Cl. 164—473 **2 Claims**

1. A continuous casting process comprising: feeding a molten metal into a mold from a metal supply system through a metal feeding duct; effecting a stepwise withdrawal of a casting from the mold for a given length and simultaneously feeding the molten metal thereinto; producing a superpressure on the forming skin of the casting by pressurizing the molten metal at intervals between casting withdrawal cycles, feeding molten metal from the metal supply system into an auxiliary vessel prefilled with an inert gas upon completion of casting



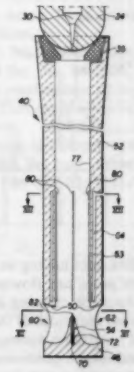
withdrawal cycle from the mold; building up a preset pressure in the molten metal inside the auxiliary vessel and in the casting being formed; causing the molten metal to move to and fro between the auxiliary vessel and the metal feeding duct of the metal supply system; feeding molten metal into the mold from the auxiliary vessel and from the metal supply system while the casting is being withdrawn from the mold for a given length.

4,487,251

CONTINUOUS CASTING APPARATUS AND A METHOD OF USING THE SAME

John B. Caboon, Riverside, Calif., and Mark K. Fishler, Pittsburgh, Pa., assignors to Vesuvius Crucible Company, Pittsburgh, Pa.

Filed Mar. 8, 1982, Ser. No. 356,218
Int. Cl.³ B22D *11/10*
U.S. Cl. 164—475 **8 Claims**



1. A nozzle for delivering molten material below the surface of a body of molten material, comprising:

an elongated member having wall members and a molten material conduit defined by inner wall surfaces of said wall members extending from a first end to a second end thereof for deliverying a flow of molten material from said first end to said second end below the surface of said body of molten material;

a base portion adjacent said second end of said elongated member and having inner surface portions exposed to said molten material and adapted for diverting the direction of

molten material flow from that established in said conduit; and

means for passing a selected fluid medium through said inner wall surfaces of said elongated member and said inner surface portions of said base portion toward and transverse to the direction of flow of molten material therealong to retard the accumulation of undesirable formations on said inner wall surfaces and inner surface portions during the flow of molten material therealong.

7. A method of delivering molten material below the surface of a body of molten material comprising the steps of:

A. proviing a tubular member having a molten material conduit therethrough with porous inner wall portions for delivering a flow of molten material downwardly to below an upper surface of a body of molten material and a base portion for diverting the direction of flow of said molten material at the lower end of said conduit, said tubular member and said base portion having porous inner wall portions;

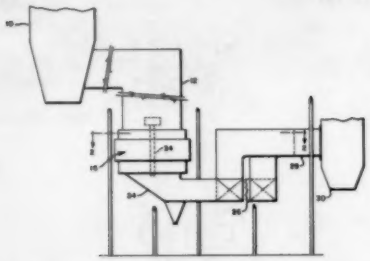
B. passing a selected fluid medium through a passageway formed in wall members of said tubular member and base portion to said porous inner wall portions; and

C. percolating said selected fluid medium through said porous inner wall portions of said tubular member and said base portion to retard accumulation of material on the molten material conduit and said base portion as said flow of molten material is delivered downwardly through said tubular member.

4,487,252
DUCT ARRANGEMENT TO ELIMINATE EXIT GAS TEMPERATURE IMBALANCE ON ROTARY HEAT EXCHANGERS

Joseph J. Natale, Enfield, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Aug. 9, 1983, Ser. No. 521,772
Int. Cl.³ B01F *5/00*; F28D *19/00*
U.S. Cl. 165—7 3 Claims

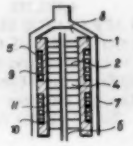


1. In combination, a first duct having an inlet and outlet end, through which first hot gases are flowing, first means positioned within the first duct for creating a temperature unbalance of the hot gases across the width of the first duct, a second duct having an inlet and outlet end, through which second hot gases are flowing, second means positioned within the second duct for creating a temperature unbalance of the hot gases across the width of the second duct, a third duct, said third duct having a first wall, and a second wall opposite to the first wall, the outlet end of the first duct being connected to the third duct, the outlet end of the second duct being connected to the third duct at a point downstream of the connection between the first and third duct, the first duct being connected to the third duct in such a manner that the hotter gases flowing therethrough enter the third duct adjacent to said first wall, and the relatively cooler gases flowing therethrough enter the third duct adjacent to said second wall, and the second duct being connected to the third duct in such a manner that the hotter gases flowing therethrough enter the third duct adjacent to said second wall, and the relatively cooler gases flowing therethrough enter the third duct adjacent to said first wall, so that there is little or no temperature unbalance of the flowing hot gases across the width of the third duct.

4,487,253
HEAT EXCHANGER FOR CRYOSURGICAL INSTRUMENTS

Zdenek Malek; Stanislav Jelinek; Alexandr Belling; Vladimir Matena, and Jan Jelinek, all of Prague, Czechoslovakia, assignors to Vyzkumny ustav silnoproude elektrotechniky, Prague, Czechoslovakia

Filed Nov. 5, 1981, Ser. No. 318,581
Claims priority, application Czechoslovakia, Nov. 12, 1980, 7677-80
Int. Cl.³ F28F *1/40*; F28D *17/00*
U.S. Cl. 165—11 R 3 Claims



1. A heat exchanger for cryosurgical instruments comprising

a mantle containing individual layers of a heat exchange substance selected from the group consisting of a heat exchange material and a heat exchange filler,

an outer jacket surrounding said mantle and said individual layers of heat exchange substance,

means defining a contact zone within said outer jacket for receiving the cooling fluid of said heat exchanger,

said mantle further comprising a first heat exchange chamber containing a heat detector,

said heat exchange chamber and said heat detector both being separated by said mantle from said means defining said contact zone, and wherein

said heat detector is in thermal contact with said outer jacket, and

each of said individual layers is positioned within said mantle a spaced distance from every other individual layer, so that said individual layers of said substance are mutually separated from one another.

4,487,254
TEMPERATURE CONTROL UNIT FOR VEHICULAR AIR CONDITIONING UNIT

Toshio Hayashibara, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 12, 1983, Ser. No. 484,223
Claims priority, application Japan, Apr. 16, 1982, 57-62313
Int. Cl.³ F25B *29/00*; F28F *27/00*
U.S. Cl. 165—16 20 Claims

1. A temperature control unit for a vehicular air conditioning unit comprising:

a blast unit for blowing air with different velocities;

an evaporator for cooling the air blown from said blast unit;

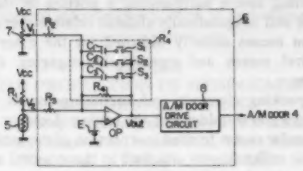
a heater for heating said cooled air;

an air mix door for distributing said cooled air into air to be passed through said heater and air not to be passed therethrough;

a sensor for detecting the blowoff temperature of the air blown into the compartment; and

a control circuit for comparing a blowoff temperature which has been detected by said sensor with a preset temperature to drive said air mix door, said control circuit being provided with a variable gain, and means for increasing the

gain of said control circuit when said blast unit blows the air with a high air velocity and for decreasing the gain of



said control circuit when said blast unit blows the air with a low air velocity.

4,487,255

CONTROL FOR A FLUID-DRIVEN FAN

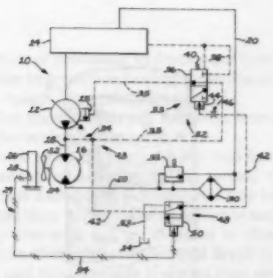
Donald L. Bianchetta, Coal City, and Robert W. White, Joliet, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

PCT No. PCT/US81/01691, § 371 Date Dec. 17, 1981, § 102(e) Date Dec. 17, 1981, PCT Pub. No. WO83/02132, PCT Pub. Date Jun. 23, 1983

PCT Filed Dec. 17, 1981, Ser. No. 527,779

Int. Cl.³ F01P *7/02*

U.S. Cl. 165—39 **8 Claims**



1. In a fan drive system (10) having a fluid motor (16) connected to a cooling fan (22), a tank (14), a variable displacement pump (12) having a fluid control actuator (15), the pump (12) being connected to the fluid motor (16) for driving the fan (22), a source (43) of pressurized pilot fluid, and a heat exchanger (26) adapted to receive air from the cooling fan (22), the improvement comprising:

means (32) for changing the displacement of the pump (12) to operate at a first operative displacement position for a predetermined time period from initial start-up and automatically reducing the displacement of the pump (12) to a second, standby displacement position at the expiration of said predetermined time period, said pump being changed to the first operative position in response to a control signal directed to the control actuator (15) and to the standby position in the absence of said control signal;

said displacement changing means (32) including first valve means (33) movable to a first position to direct the control signal (34) to the control actuator (15) and to a second position to block the control signal (34) to the control actuator (15), and a second valve means (48) for selectively directing fluid from the source (43) to move said first valve means (33) to the second position in response to the temperature level in the heat exchanger (26) exceeding a predetermined level.

4,487,256

CRYOGENIC HEAT EXCHANGER

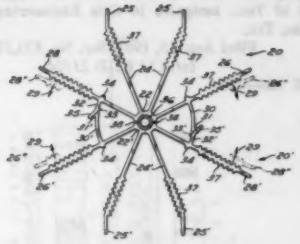
Robert D. Lutjens, Hacienda Heights, and Paul P. Duron, Corona Del Mar, both of Calif., assignors to Cryomec, Inc., Anaheim, Calif.

Filed Jul. 10, 1981, Ser. No. 282,259

Claims priority, application Switzerland, Jul. 10, 1980, 5295/80

Int. Cl.³ F28F *1/20*

U.S. Cl. 165—76 **15 Claims**



1. A method for removably attaching heat transfer sleeve sections having a plurality of heat transfer fins to a conduit, comprising the steps of:

locating interlocking means on said heat transfer fins a predetermined distance from the center of said heat transfer sleeves;

elastically deflecting adjacent heat transfer fins of adjacent heat transfer sleeve sections toward one another so that said heat transfer fins are in a flex state when said adjacent interlocking means are engaged, thereby causing said heat transfer sections to compress against the conduit; and detachably joining said adjacent fins so that elastic deformation of said fins is maintained.

4,487,257

APPARATUS AND METHOD FOR PRODUCTION OF ORGANIC PRODUCTS FROM KEROGEN

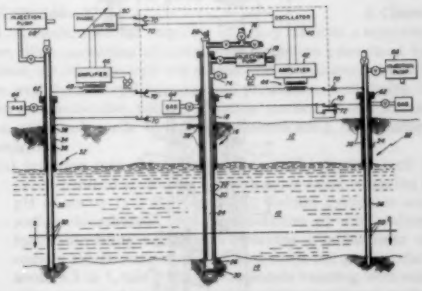
Thonet C. Dauphiné, Acton, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 089,000, Oct. 29, 1979, abandoned, which is a division of Ser. No. 845,504, Oct. 25, 1977, Pat. No. 4,193,451, which is a continuation of Ser. No. 696,976, Jun. 17, 1976, abandoned. This application Sep. 30, 1981, Ser. No. 307,132

The portion of the term of this patent subsequent to Mar. 18, 1997, has been disclaimed.

Int. Cl.³ E21B *36/04*

U.S. Cl. 166—60 **6 Claims**



1. Apparatus for producing organic liquid and/or gaseous products of dissociation of an organic compound in a subsurface body comprising:

means for heating regions of said body to temperatures where said compound converts to said liquid and/or gase-

ous products comprising radiating means extending into said subsurface body for producing in said body time varying electric fields; and

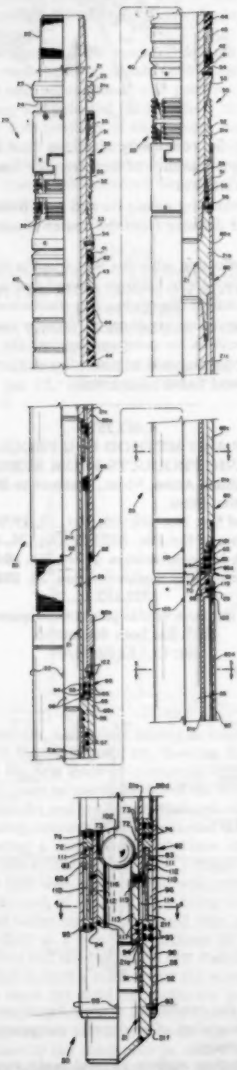
means for producing said fluid products of dissociation from said body comprising passage means for allowing the flow of said products through said body while said field is applied to said body.

4,487,258

HYDRAULICALLY SET WELL PACKER

Alan T. Jackson, Irving, and William D. Henderson, Frisco, both of Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Filed Aug. 15, 1983, Ser. No. 523,376
Int. Cl.³ F21B *23/04*
U.S. Cl. 166—120 **11 Claims**



1. A hydraulically set well packer, for forming a fluid barrier at a downhole location within a well bore, having a mandrel means with packing elements and anchoring means carried on its exterior and a longitudinal bore extending therethrough, comprising:

a. a shoulder on the exterior of the mandrel means;

b. a setting sleeve surrounding a portion of the mandrel means and longitudinally slidable relative thereto;

c. piston means slidably disposed on the exterior of the mandrel means and operatively engaging the setting sleeve;

d. the packing elements and anchoring means positioned between the shoulder and the setting sleeve;

e. an annular recess formed in a portion of the setting sleeve;

f. flexible collet fingers attached to the mandrel means;

g. a collet head on the end of each finger; and

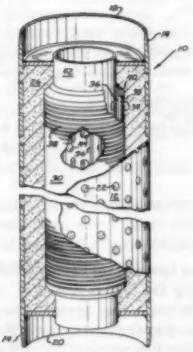
h. means for releasably engaging the collet heads with the annular recess.

4,487,259

PREPACKED WELL SCREEN AND CASING ASSEMBLY

Charles W. McMichael, Jr., Duson, La., assignor to UOP Inc., Des Plaines, Ill.

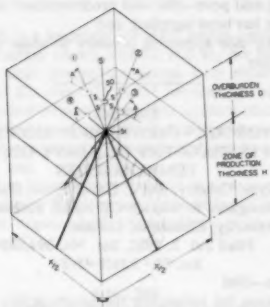
Filed Mar. 17, 1983, Ser. No. 476,180
Int. Cl.³ E21B *43/08*
U.S. Cl. 166—228 **4 Claims**



1. A prepacked well screen and casing assembly adapted to be lowered into a well comprising an outer casing member having threaded coupling portions at the ends thereof, an extended length perforated intermediate portion, and unperforated end portions adjacent said threaded coupling portions; a slotted surface well screen jacket member supported internally of said casing member on a generally cylindrical base member, said generally cylindrical base member being of less length than said casing member and having a longitudinally extending perforated intermediate portion located within said well screen jacket member and unperforated end portions which extend from the ends of said base member which are outside said well screen jacket member to locations inside said jacket member; a pair of annular metal rings which are formed of a material softer than said screen jacket member welded to the exterior of said end portions of said base member and to the interior of said

end portions of said casing member, said rings defining the ends of an annular chamber which extends axially beyond each end of said well screen jacket member; and a consolidated packing of porous, bonded together, resin-coated gravel or sand within said annular chamber and within the perforations of said perforated intermediate portion of said casing member.

4,487,260
IN SITU PRODUCTION OF HYDROCARBONS INCLUDING SHALE OIL
Robert W. Pittman, Sugarland, and Marc F. Fontaine, Houston, both of Tex., assignors to Texaco Inc., White Plains, N.Y.
Filed Mar. 1, 1984, Ser. No. 584,980
Int. Cl.³ E21B *43/247*
U.S. Cl. 166—259 **15 Claims**



1. The method of producing hydrocarbons from a subterranean fracturable hydrocarbon-bearing formation characterized by a fracture length comprising the steps of

drilling a first borehole into said formation from a first location on the surface of the earth,

drilling second and third boreholes into said formation from second and third locations on the surface of the earth spaced from each other and from said first location, said second and third boreholes being drilled in such directions that they converge and are disposed in close proximity with one another at a predetermined depth in said formation and said third borehole is spaced from said first borehole at said predetermined depth a distance not greater than said fracture length,

fracturing at said predetermined depth a first portion of said formation included between said second and third boreholes to create a fractured communication path therebetween,

initiating in said third borehole at said fractured communication path a combustion process having a combustion front,

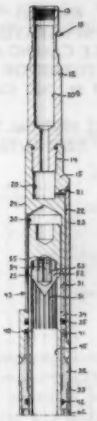
maintaining said combustion front by injection of a combustion-supporting gas into said third borehole so that said front proceeds through said formation first portion and produces hydrocarbons into said second borehole, said combustion process heating a second portion of said formation adjacent to said formation first portion included between said third and first boreholes to a temperature at which thermal fracturing occurs in said formation to create a thermofractured communication path within said formation second portion between said third and first boreholes,

initiating in said third borehole at said thermofractured communication path a process having a second combustion front,

maintaining said second combustion front by injection of a combustion-supporting gas into said third borehole so that said front proceeds through said formation second portion and produces hydrocarbons into said first borehole, and

producing hydrocarbons from said first and second boreholes.

4,487,261
WELL COMPLETION AND TESTING SYSTEM
Imre I. Gazda, Saginaw, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.
Filed Aug. 5, 1981, Ser. No. 290,215
Int. Cl.³ E21B *49/08*
U.S. Cl. 166—264 **27 Claims**



16. A well completion and testing assembly including well tool landing and locking means forming an integral tubing string section and a removable operating probe releasably connectible in said landing and locking means having means for connection to well fluid measuring means, valve means for fluid flowing and shutting-in fluid flow along a tubing string including said landing and locking means, said valve means being opened and closed by said probe when said probe is landed and locked in said landing and locking means, and flow passage means providing continuous fluid communication through said probe to said measuring means.

4,487,262
DRIVE FOR HEAVY OIL RECOVERY
V. N. Venkatesan, and Winston R. Shu, both of Dallas, Tex., assignors to Mobil Oil Corporation, New York, N.Y.
Filed Dec. 22, 1982, Ser. No. 452,163
Int. Cl.³ E21B *43/22, 43/24*
U.S. Cl. 166—271 **4 Claims**

1. A method for the recovery of heavy oil from a subterranean silica-containing oil-containing formation penetrated by at least one injection well and at least one spaced-apart production well, both of said injection and production wells being in fluid communication with a substantial portion of said formation, and such wells having a communicating relationship, comprising:

(a) injecting into the formation via said injection well a predetermined amount of a hot aqueous solution having a pH of above 11.0 and containing sodium hydroxide and sodium bicarbonate, the concentration of said sodium hydroxide being sufficient to provide a molar ratio of sodium bicarbonate to sodium hydroxide not greater than about 3.3 to 1, said sodium bicarbonate reacting with said silica contained in the formation under conditions in the formation to form water-soluble sodium silicate, water and carbon dioxide and said sodium hydroxide reacting with said silica contained in the formation under conditions in the formation to form water-soluble sodium sili-

cate and water plus the thermal energy necessary to provide the heat of reaction required between the sodium bicarbonate and the silica, said in-situ formed carbon dioxide dissolving in the oil reducing its viscosity and the water-soluble sodium silicate lowering the residual oil saturation of the formation;

(b) injecting a driving fluid into the formation via said injection well to displace said mobilized oil through the formation toward said production well; and

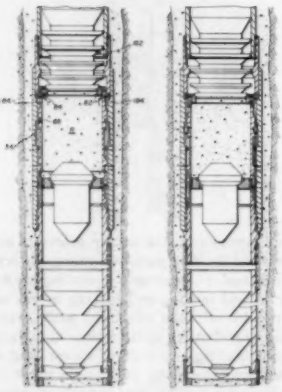
(c) recovering oil from the formation via said production well.

4,487,263

CEMENT STAGING APPARATUS FOR WELLS AND INCLUDING WELL CASING AND A PROCESS THEREFOR

William Jani, 2-3401-19 St. NE. Calgary, Alberta, Canada T2E658

Filed Dec. 27, 1982, Ser. No. 453,166
Int. Cl.³ E21B *33/13, 33/16*
U.S. Cl. 166—289 **37 Claims**



1. A cement staging apparatus for wells and including well casing, comprising:

(a) an open ended hollow body having a number of spaced ports therethrough;

(b) a first hollow member slideably associated with said body and having a first ports closed position and a second ports open position;

(c) first pressure means associated with said first member for displacing said first member and opening said ports thereby;

(d) a second hollow member slideably associated with said body and having a first ports open position and a second ports closed position and including shifting pressure relieving means cooperating with and internal of said body and adapted for facilitating sliding of said second member from said first to said second position;

(e) second pressure means associated with said second member for displacing said second member and closing said ports thereby;

(f) said second member spaced a distance from said first member;

(g) said body, said first member and said first pressure means defining a canister having an open end for receipt of a supply of pressurized cement and adapted for distributing said cement through said ports; and,

(h) said body, said first and said second pressure means and said second member define a closed canister when in said second position preventing the distribution of an additional supply of cement whereby closing of said canister by sliding of said second member in cooperation with said second pressure means causes said pressure relieving means to shift and to relieve and vent said canister pressure and thereby facilitate sliding of said second member from said first to said second position.

27. A process for cementing a well in stages, comprising the steps of:

a. lowering a length of well casing having an open ended cement distribution apparatus positioned therein into said well whereby said apparatus is at a preselected depth in said well;

b. closing one end of said apparatus to permit opening of said apparatus cement distributing ports;

c. connecting said cement distribution apparatus to a source of pressurized cement;

d. supplying a predetermined amount of pressurized cement to said apparatus to open said ports and to distribute a substantial portion of said cement into said well;

e. closing said ports after said predetermined amount of said cement has been supplied; and

f. relieving said apparatus pressure to assist the closing of said ports.

4,487,264

USE OF HYDROGEN-FREE CARBON MONOXIDE WITH STEAM IN RECOVERY OF HEAVY OIL AT LOW TEMPERATURES

James B. Hyne, Calgary, and J. David Tyrer, Oakville, both of Canada, assignors to Alberta Oil Sands Technology and Research Authority, Edmonton, Canada

Filed Jul. 2, 1982, Ser. No. 394,685
Int. Cl.³ E21B *43/24*
U.S. Cl. 166—300 **1 Claim**

1. A process for enhancing the producability of heavy oil from a reservoir, comprising:

injecting into the reservoir steam and carbon monoxide, substantially free of hydrogen, at a temperature less than about 260° C., and reacting said injected steam and carbon monoxide in situ to form carbon dioxide and hydrogen, whereby the formed products enhance the producibility of the heavy oil.

4,487,265

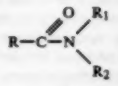
ACIDIZING A SUBTERRANEAN RESERVOIR

David J. Watanabe, Orange, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Dec. 22, 1981, Ser. No. 333,439
Int. Cl.³ E21B *43/27*
U.S. Cl. 166—307 **29 Claims**

1. A retarded acidizing composition for treating a subterranean hydrocarbon-producing reservoir penetrated by a well having a bottom hole temperature of up to about 400° F. comprising a solution of:

(a) about 5 to 75 parts by volume of a mixture of (1) about 25 to 75 percent by volume of a proton-carrying first mutual solvent comprising a tertiary carboxylic acid alkylated amide characterized by the formula:



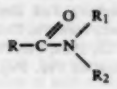
wherein (1) R is a hydrogen or alkyl group containing 1 to about 8 carbon atoms, and (2) R_1 and R_2 are the same or different alkyl groups containing 1 to about 8 carbon atoms and (2) about 75 to 25 percent by volume of a second mutual solvent comprising a glycol ether having at least one alkyl group containing 2 to 10 carbon atoms, said glycol ether containing about 3 to 22 carbon atoms per molecule, and

(b) about 95 to 25 parts by volume of an aqueous solution of

an acid selected from the group consisting of low molecular weight organic acids, hydrochloric acid, and admixtures thereof.

14. A method for acidizing a subterranean hydrocarbon-producing or geothermal fluid-producing containing reservoir penetrated by a well having a bottom hole temperature of up to about 400° F. comprising injecting into said reservoir a solution of:

(a) about 5 to 75 parts by volume of a mixture of (1) about 25 to 75 percent by volume of a proton-carrying first mutual solvent comprising a tertiary carboxylic acid alkylated amide characterized by the formula:



wherein R is a hydrogen or alkyl group containing 1 to about 8 carbon atoms, and R_1 and R_2 are the same or different alkyl groups containing 1 to about 8 carbon atoms and (2) about 75 to 25 percent by volume of a second mutual solvent comprising a glycol ether having at least one alkyl group containing 2 to 10 carbon atoms, said glycol ether containing about 3 to 22 carbon atoms per molecule, and

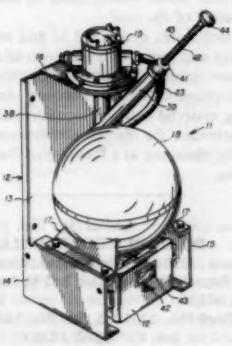
(b) about 95 to 25 parts by volume of an aqueous solution of an acid selected from the group consisting of low molecular weight organic acids, hydrochloric acid and admixtures thereof.

4,487,266

EXPLOSION SUPPRESSION APPARATUS

Joseph P. Gillis, Westboro, and William G. Andrew, Sudbury, both of Mass., assignors to Kidde, Inc., Saddle Brook, N.J.

Filed Feb. 1, 1982, Ser. No. 344,531
Int. Cl.³ A62C *35/00*
U.S. Cl. 169—51 **20 Claims**



1. Explosion suppression apparatus comprising:

structural means enclosing a protected zone;

a source of a pressurized explosion suppressant;

pressure detector means for detecting pressure waves;

release means for releasing said suppressant into the protected zone in response to detection of a pressure wave by said detector means, said release means comprising a discharge port opening into the protected zone;

tubulation means including an inclined portion providing fluid communication between said detector means and the protected zone, said inclined portion comprising both vertical and horizontal components of substantial magnitude and defining an inlet port opening into the protected zone, and wherein said source, said release means and said tubulation means are disposed externally of said structural means and disposed horizontally with respect to said protected zone; and

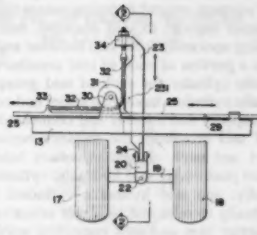
portable unitary frame means supporting said source, said tubulation means, and said release means.

4,487,267

AGRICULTURAL APPARATUS WITH TOOL SUPPORTED THEREON AND WHEEL ADJUSTMENT STRUCTURE THEREFOR

Terrance Friggstad, Frontier, Canada, assignor to Friggstad Manufacturing Ltd., Frontier, Canada

Filed Jan. 26, 1983, Ser. No. 461,259
Int. Cl.³ A01B *63/22*
U.S. Cl. 172—310 **17 Claims**



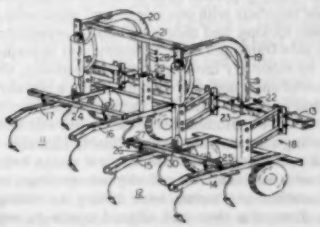
10. An agricultural apparatus comprising a main frame, ground wheel means for supporting the main frame a predetermined distance from the ground, a ground working tool supported by the main frame and arranged to operate on the ground to a depth determined by the position of the frame relative to the ground, and means for adjusting the position of the wheel means relative to the frame comprising a thrust bar, means mounting the thrust bar such that vertical movement of the thrust bar moves the wheel means vertically relative to the frame, an elongate adjusting bar, means mounting the adjusting bar for horizontal movement along its length on the frame, flexible coupling means connecting said adjusting bar to said thrust bar and guide means for guiding movement of said coupling means about a horizontal axis transverse to the direction of movement of said adjusting bar whereby horizontal movement of the adjusting bar causes said coupling means to move around the axis and apply vertical force to said thrust bar, including yoke means for supporting said guide means wherein said adjusting bar extends through the yoke means.

4,487,268

LIFTING ATTACHMENTS FOR CULTIVATORS

Lester B. Greve, R.R. 1, Sabula, Iowa 52070

Filed Jan. 31, 1983, Ser. No. 462,351
Int. Cl.³ A01B *63/10*
U.S. Cl. 172—316 **1 Claim**



1. A lift assembly for a cultivator,

said cultivator being the type having a plurality of earth-working implements, each of said implements having a carrier bar and an earth-working tool assembly depending from said respective carrier bar, a forward drawbar to be hitched transversely to a tractor, pivotal means for each of said carrier bars, said carrier bars having respective front ends connected along spaced points to said drawbar by said respective pivotal means, said pivotal means permitting raising and lowering each of said earth-working tool assemblies individually, said earth-working implements to be arranged successively into a plurality of groups,

said lift assembly comprising: a lifting crossbar for each of said groups, each of said lifting crossbars positioned crosswise said carrier bars of a respective one of said groups on a transverse line spaced rearward from said pivotal means, first fastening means connected together said crossbars and said carrier bars at each crossing thereof,

an upper support, second fastening means rigidly connecting said upper support to said drawbar, said upper support extending upwardly from said drawbar and rearward over at least a portion of each of said crossbars,

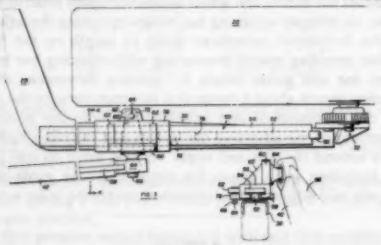
a hydraulic cylinder for each of said groups, each of said hydraulic cylinders having an upper end connected to said upper support and a lower end connected to a respective one of said crossbars, the distance between said upper support and each of said crossbars being sufficient to facilitate positioning said hydraulic cylinders substantially vertically, and said hydraulic cylinders being operable individually to raise and to lower selectively said respective carrier bars and said respective earth-working tool assemblies attached thereto.

4,487,269

DOZER BLADE ANGLE ADJUSTMENT MECHANISM

Claude M. Frisbee, Bettendorf, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Apr. 22, 1983, Ser. No. 487,796
Int. Cl.³ E02F 3/76
U.S. Cl. 172—818 **8 Claims**



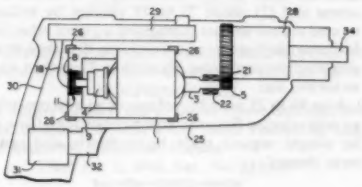
1. An angle adjustment mechanism for an implement mounted on a vehicle, the assembly including a frame pivotally supporting said implement at one end of said vehicle for angled movement about a vertical axis of said implement, said frame including side frame portions on opposed sides of said vehicle, slide members slidably mounted on rails supported on each of said side frame portions, strut means interconnecting each of said slide members with one side of said implement and anchor pin means locking said slide members at preselected locations on said side frame portions, whereby said implement may be angled by relatively moving said slide members, the improvement comprising: said rails each including a plurality of spaced horizontal openings extending therethrough generally perpendicular to the longitudinal axis of said rails, said slide members each having a horizontal opening slidably alignable with one of said rail openings, and said anchor pin means being wedged-shaped and receivable in said aligned openings, said wedge-shaped anchor pin means each having an enlarged end of greater dimension than said aligned openings, whereby said slide members may be locked at preselected locations on said rails for angled adjustment of said implement, each of said rails being generally T-shaped comprising a vertical portion joined to said side frame portion and a top horizontal portion which slidably receives said slide member, said horizontal rail openings extending through said vertical slide portions, and said slide members each having a downwardly opening C-shaped channel portion slidably received on one of said T-shaped rails and said slide member openings defined by downwardly opening aligned slots in the ends of said slide member channel portions.

4,487,270

ELECTRIC TOOL, PARTICULARLY A HANDTOOL, WITH TORQUE CONTROL

Siefried Huber, Johannesberg, Fed. Rep. of Germany, assignor to Black & Decker Inc., Newark, Del.

Filed Nov. 23, 1982, Ser. No. 444,032
Claims priority, application Fed. Rep. of Germany, Nov. 24, 1981, 3146494
Int. Cl.³ B25B 23/14
U.S. Cl. 173—12 **10 Claims**



1. A power tool, comprising:

an electric motor having a motor shaft;

said motor shaft having a spiral gear through which said motor drives the tool;

a pressure sensor disposed so as to be subjected to the axial thrust of said motor shaft created by said spiral gear during operation of the tool;

torque control means connected to said pressure sensor for influencing said motor in response to said axial thrust; and

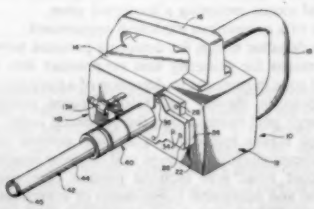
said pressure sensor comprising electrically conductive plastic disposed between a pressure plate of electrically insulating material and an electrode plate having spaced apart electrodes, the electrical resistance of said conductive plastic changing as a function of the pressure exerted thereupon.

4,487,271

PORTABLE CORE DRILL

Dan M. Pomeroy, 3720 Constitution Ave., Lummi Island, Wash. 98262, and Russell F. Burmester, 143 E. Laurel Rd., Bellingham, Wash. 98226

Filed Feb. 12, 1982, Ser. No. 348,609
Int. Cl.³ B27B 17/00
U.S. Cl. 173—29 **14 Claims**



1. A portable core drill adapted for sampling dense mineral

specimens or the like by urging a fluid cooled/lubricated tubular drill bit into a dense mineral mass from which a sample is to be extracted, said drill comprising:

(a) drive engine means for imparting a drilling-effective rotary motion to a tubular drill bit about a longitudinal drill axis; and,

(b) spindle means for drive coupling said drill bit to said drive engine means, said spindle means including thrust decoupling means for axial thrust isolation of said drive engine means from loads impressed upon said drill bit and bit fastening means for receiving and retaining said drill bit concentrically in respect of said axis;

wherein said bit fastening means comprises bit-engaging collet means received in a collet housing having tapered side walls and an end wall, and rotatable compression means (i) for constricting said collet means about the outer sidewall of said drill bit proximate the proximal end thereof upon rotation of said compression means and (ii) for urging said collet means outwardly of said collet housing along said axis upon counter-rotation thereof, whereby said drill bit may be operatively engaged with and disengaged from said bit fastening means by hand rotation and counter-rotation of said compression means, respectively.

4,487,272

IMPACTING DRILL

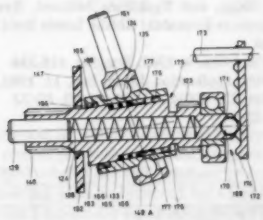
Manfred Bleicher, Leinfelden; Wolfgang Schmid, Plattenhardt, and Karl Wanner, Echterdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Sep. 27, 1982, Ser. No. 424,986

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1982, 3205141

Int. Cl.³ B25D *11/00*

U.S. Cl. 173—48 **30 Claims**



1. An impacting drill operative for rotating and selectively imparting impacts to a tool mounted thereon, comprising a support; an air cushion mechanism mounted on said support for reciprocation axially of the tool and operative for impacting the latter; and means for selectively reciprocating said air cushion mechanism, including a shaft mounted on said support for rotation about an axis offset from said air cushion mechanism, a holding member rigid with said shaft and centered on an adjustment axis enclosing a first acute angle with said axis, means for rotating said shaft about said axis, a tumbling mechanism including a hub body mounted on said holding member for angular displacement about said adjustment axis between a plurality of angular positions, a ring-shaped tumbling member extending around said shaft along a tumbling plane and having a portion that is in force-transmitting engagement with said air cushion mechanism, and means for so mounting said tumbling member on said hub body that said tumbling plane encloses a second acute angle with a plane normal to said adjustment axis, and means for so releasably connecting said hub body of said tumbling mechanism to said shaft for joint rotation therewith in any of said angular positions that said tumbling plane rotates with said shaft and said portion of said tumbling member swivels in a plane extending in the direction of reciprocation of said air cushion mechanism within an angular range depending on the angular position of said hub body of said tumbling mechanism on said holding member and thus on the resulting angle enclosed between said tumbling plane and said axis of said shaft.

4,487,273

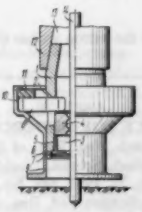
GRIPPING TOOL ADAPTED FOR USE WITH DEVICE FOR DRIVING ROD-SHAPED ELEMENTS INTO AND OUT OF THE GROUND

Boris N. Smolyanitsky; Vladimir P. Boginsky; Vladimir P. Gileta; Jury N. Syryamin, and Alexei D. Terskov, all of Novosibirsk, U.S.S.R., assignors to Institut Gornogo Dela, Novosibirsk, U.S.S.R.

Filed Feb. 24, 1983, Ser. No. 469,576

Int. Cl.³ E21B *1/00*

U.S. Cl. 173—55 **3 Claims**



1. A gripping tool adapted for use with a device for driving rod-shaped elements into and out of the ground comprising a shell with side walls; ports made in the side walls of said shell; an axial taper through cavity made inside said shell with the generatrix forming an angle with the shell centre line less than the self-wedging angle; spring-biased gripping jaws accommodated inside said taper cavity; levers inserted into said ports and interacting by their inner ends with said gripping jaws; an abutment sleeve having an inside annular recess and installed on the external surface of said shell; a rubber shock absorber disposed between the upper surface of said recess and the outer ends of said levers.

4,487,274

ROCK DRILLS

John A. Hurt, Brookside, England, assignor to Weaver & Hurt Limited, England

Filed Jul. 21, 1982, Ser. No. 400,233

Int. Cl.³ E21C *3/24*

U.S. Cl. 173—134 **3 Claims**

1. An air operated down-the-hole drill comprising a backhead for the connection of a drill to a source of compressed air, a wear sleeve secured to the backhead and a chuck adapted to retain a drill bit secured to the opposite end of the wear sleeve, there being within the wear sleeve an inner cylinder with a valve seat at one (inner) end of the cylinder having a valve stem extending into the cylinder and a piston within the cylinder reciprocable therein from one position where the valve stem engages in a bore in the piston to a second position where a stem on the piston enters a bearing located in the cylinder and strikes a drill bit held within the chuck, the dimensions of the piston being such that the ratio of the piston head area to its bore area is in the range 9.9/9.95 to 1, the ratio of the piston head length to the piston stem length is in the range 1.5/1.52 to 1, the ratio of the piston head diameter to the piston stem

diameter is in the range 1.4/1.43 to 1 and the ratio of the piston stem length to the length of the piston stem within the bearing

at the point at which the piston strikes the drill bit is 1.4/1.45 to 1.

4,487,275

DRILLING DEVICE FOR UNDERCUT BOREHOLES

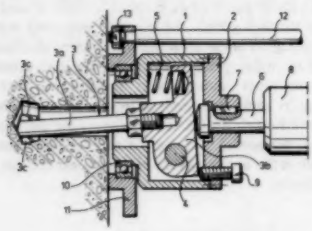
Peter Froehlich, Pullach, Fed. Rep. of Germany, assignor to Hilti Aktiengesellschaft, Schaan, Liechtenstein

Filed Feb. 22, 1983, Ser. No. 468,369

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1982, 3206387

Int. Cl.³ E21B *1/02*

U.S. Cl. 175—170 **6 Claims**



1. Drilling device for forming a borehole with an undercut comprising a driving member, such as a hammer drill, including an axially extending drive shaft, an axially extending bearing housing arranged to be rotated about the axis of said housing by said drive shaft, a cutting edge support having an axis of rotation and a pivot axis extending transversely of the axis of rotation and of the axis of said bearing housing, said cutting edge support having the axis of rotation thereof extending substantially in the direction of the axis of said bearing housing and outwardly away from said driving member, said cutting edge support includes cutting edges at the end thereof more remote from said driving member, said drive shaft is engaged with said housing so that it rotates said housing and is axially displaceable relative to said housing, said drive shaft arranged to contact said cutting edge support, wherein the improvement comprises that said cutting edge support has a first end and a second end spaced apart in the direction of the axis of rotation thereof with the first end located within said housing and the second end projecting outwardly from said housing in the direction away from said driving member, said cutting edge support includes a lever arm located within said bearing housing and extending transversely of the axis of rotation thereof, and a pivot axle pivotally mounting said lever arm and located on the pivot axis of said cutting edge support, said pivot axle being located radially outwardly from said drive shaft.

4,487,276

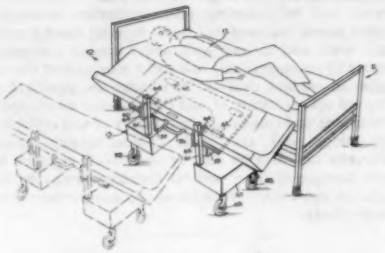
SCALE OF FLAT CONSTRUCTION

Burt L. Swersey, 152 Edgemont Rd., and Peter I. Fried, 15 Hearthstone Cir., both of Scarsdale, N.Y. 10583

Filed May 3, 1983, Ser. No. 374,177

Int. Cl.³ G01G *21/00, 19/08, 3/14, 21/22*

U.S. Cl. 177—1 **33 Claims**



28. A method of weighing a bed-ridden patient comprising the steps of

placing a scale of low profile on top of a bed and beside a bed ridden patient;

placing the bed-ridden patient on the scale; and

obtaining a read-out of the weight of the patient.

4,487,277

CONTAINER DISTRIBUTING AND CHARGING APPARATUS

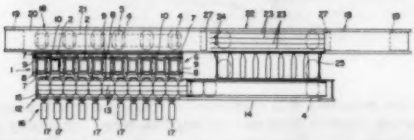
Souji Morita, Shiga, and Yoshiharu Mikami, Kyoto, both of Japan, assignors to Kabushiki Kaisha Ishida Koki Seisakusho, Kyoto, Japan

Filed Sep. 9, 1982, Ser. No. 416,324

Claims priority, application Japan, Sep. 11, 1981, 56-144533

Int. Cl.³ G01G *13/24, 19/00, 19/22*

U.S. Cl. 177—25 **8 Claims**



1. A container distributing and charging apparatus, comprising:

a plurality of arrayed weighing machines;

a stock table, disposed alongside said weighing machines, for supporting an array of containers with articles contained therein;

means for guiding the containers in mutually spaced relation from said stock table onto those weighing machines which are selected as a result of a combinatorial weighing operation for previously discharged containers, said means for guiding comprising a guide plate corresponding to each weighing machine and having a guide portion, each of the containers having rounded corner portions and being separated from each other by the guide portion of said guide plate as the containers move onto said weighing machines, with at least one of the containers arrayed on said stock table serving as a dummy container which is kept from being moved onto a weighing machine; and

means for pushing the selected containers in mutually spaced relation from said stock table onto selected weighing

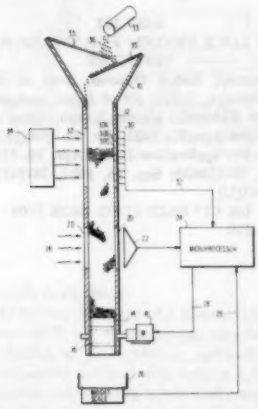
machines to thereby discharge the weighed containers therefrom.

4,487,278

INSTRUMENT FOR PROVIDING AUTOMATIC MEASUREMENT OF TEST WEIGHT

Robert D. Rosenthal, Gaithersburg, Md., assignor to Trebor Industries, Inc., Gaithersburg, Md.

Filed Aug. 24, 1983, Ser. No. 525,884
Int. Cl.³ G01G 19/52; G01N 9/02
U.S. Cl. 177—25 11 Claims



1. An instrument for automatically and accurately determining the test weight per bushel of grain, comprising:

(a) a confined column having a constant cross sectional area for containing grain to be tested for weight per bushel,

(b) means for sequentially dumping a plurality of batches of grain to be tested from the bottom of the column,

(c) means for automatically determining the height of the grain in the column prior to and after the dumping of each batch of grain from the column,

(d) weighing means for weighing each batch of grain dumped from the column,

(e) microprocessor means receiving information from the weighing means and the height of the grain column detecting means and calculating the weight per bushel.

11. A method of automatically determining the weight per unit volume of grain comprising;

(a) pouring grain into a columnar zone of a constant cross-sectional area so that the height of grain in the column is readily translatable to volume,

(b) dumping small batches of grain from the bottom of the columnar zone so that each batch dumped decreases the height of the grain in the columnar zone,

(c) weighing accurately the weight of each batch dumped,

(d) measuring accurately the height of the grain in the columnar zone after each batch is dumped,

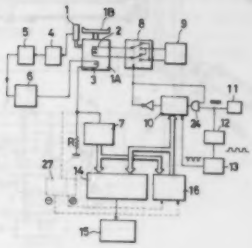
(e) automatically calculating the test weight per unit volume using the change in weight and change in height measurements as applied to linear regression equations after excluding the first several batches.

4,487,279

ELECTRONIC BALANCE

Akira Komoto, Otsu, Japan, assignor to Shimadzu Corporation, Kyoto, Japan

Filed Aug. 19, 1982, Ser. No. 409,423
Claims priority, application Japan, Aug. 21, 1981, 56-131711
Int. Cl.³ G01G 7/00, 3/14
U.S. Cl. 177—212 8 Claims



1. An electronic balance comprising:

a force equilibrating unit which electromagnetically compensates a weight to be measured, consisting of a weight receiving tray, a displacement detector for detecting the displacement of said weight receiving tray, a magnetic circuit to provide a static magnetic field, and a force coil assembly mechanically connected with said weight receiving tray and movably located in said static magnetic field, said force coil assembly being made up of a first coil and a second coil:

a first current-supplying means for supplying to said first coil a pulsed first current whose duty factor is controlled by a first digital value to be predetermined;

a second current-supplying means for supplying to said second coil a second current which corresponds to the output of said displacement detector;

a digital value determining means for determining said first digital value when the output of said displacement detector reaches a predetermined upper or lower limit;

a digital value generator for generating a second digital value which corresponds to the average value of said second current; and

an arithmetic unit which derives a weight value by adding said second digital value to said first digital value.

4,487,280

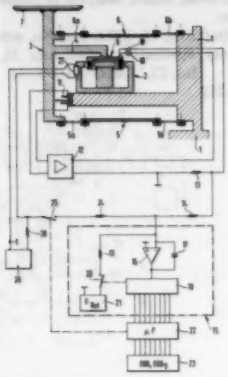
HIGH-RESOLUTION ELECTRONIC BALANCE

Erich Knothe, Bovenden; Franz-Josef Melcher, Hardegsen; Christian Oldendorf, Göttingen, and Jürgen Ober, Hardegsen, all of Fed. Rep. of Germany, assignors to Sartorius GmbH, Fed. Rep. of Germany

Filed Mar. 31, 1983, Ser. No. 480,721
Claims priority, application Fed. Rep. of Germany, Apr. 7, 1982, 3213016
Int. Cl.³ G01G 7/00, 3/14
U.S. Cl. 177—212 10 Claims

1. Electronic balance comprising a measure value receiver which emits an analog electrical signal, a high-resolution digitizer on the output side, a digital signal processing unit, and means for correcting errors caused by the temperature of the measured value receiver, characterized in that a switch (25) is

provided which feeds the output signal of at least one temperature sensor (27) to the input of the digitizer (15) in addition to



the signal of the measured value receiver (1 . . . 13) at certain times controlled by the digital signal processing unit (22).

4,487,281

POWER-ASSISTED RACK-AND-PINION STEERING MECHANISM

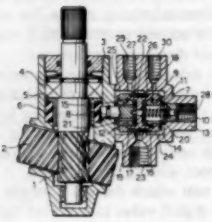
Ettore Cordiano, Turin, Italy, assignor to Corint S.r.l., Turin, Italy

Filed Nov. 2, 1982, Ser. No. 438,554

Claims priority, application Italy, Nov. 9, 1981, 68448 A/81

Int. Cl.[3] **B62D** *3/12, 5/08;* **F15B** *9/10*

U.S. Cl. 180—148 **9 Claims**



1. A power-assisted rack-and-pinion steering mechanism for motorvehicles of the kind comprising:

A rack,

A helical-tooth pinion,

A two-chambers actuator assisting the rack in its axial displacement,

A valve which, depending on the torque applied to the pinion, adjusts the pressure head between the two chambers of the actuator,

A reservoir of fluid, and

A pump driven by the vehicle engine and producing the pressure head in the actuator chambers, the valve being of the slide-valve kind, with the slide member moving in translation along a stationary axis different from that of the pinion, to which pinion it is connected by means of a mechanism with a high transmission ratio, the slide member of the valve comprising a piston provided with a rim on each end face, each rim cooperating with an associated seat formed on the valve housing or on members born by the housing, said rim and seats forming passages through which the two actuator chambers are connected to the source of low pressure fluid, said passages varying as a result of the piston axial displacements, means being provided through which also the communication between the same chambers and the source of the higher pressure fluid is varied depending on the piston displacements, piston and seats being so designed that the fluid pressure in the operative chamber acts upon the surface of the piston included between its outer diameter and the effective diameter of sealing between rim and associated seat, and thus gives on the piston a thrust which is a linear function of the force transmitted by the pinion to the piston through the transmission mechanism, with the result that the pressure in the actuator operative chamber is a linear function of the torque applied by the driver to the steering-wheel.

4,487,282

PARKING LOCK SYSTEM FOR THREE-WHEELED VEHICLES

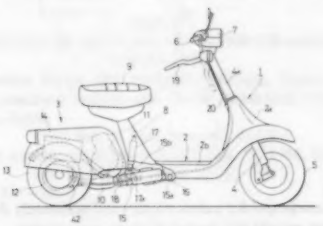
Goroei Wakatsuki; Kobei Ohzono, both of Saitama, and Masanori Shibuya, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 21, 1982, Ser. No. 370,532

Claims priority, application Japan, Apr. 21, 1981, 56-60957; Jul. 23, 1981, 56-116039; Sep. 16, 1981, 56-145774; Sep. 16, 1981, 56-137441[U]

Int. Cl.[3] **B62D** *61/08;* **B62K** *5/04*

U.S. Cl. 180—210 **21 Claims**



1. A parking lock system for a three-wheeled vehicle having front and rear vehicle bodies interconnected so as to be capable of rolling relative to each other, comprising:

a rolling shaft secured at one end thereof to said rear vehicle body and rotatably fitted at the other end thereof in said front vehicle body;

a first engagement member secured to said rolling shaft so as to be rollable substantially integrally therewith;

an engagement mechanism provided for said front vehicle body so as to be rollable substantially integrally therewith and having a second engagement member;

said engagement mechanism being engageable with said first engagement member in at least one predetermined relative position only, said engagement causing said relative rolling to be locked;

a wheel lock mechanism for locking rotation of at least one road wheel of said vehicle;

an operation element;

a substantially continuous single cable member interconnecting said operation element with said wheel lock mechanism so as to actuate said wheel lock mechanism upon operation of said operation element; and

said engagement mechanism being directly connected to said cable member so as to be actuated upon the operation of said operation element.

4,487,283

MOTORCYCLE

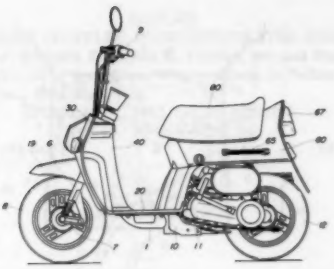
Masaaki Suzuki, Kamifukuoka; Kenzi Izawa, Asaka, and Katsumi Kimura, Kawagoe, all of Japan, assignors to Honda Motor Co., Ltd., Tokyo, Japan

Filed Sep. 29, 1982, Ser. No. 428,468

Claims priority, application Japan, Oct. 19, 1981, 56-166669; Oct. 19, 1981, 56-166671; Oct. 19, 1981, 56-166672

Int. Cl.³ B62J *17/00*

U.S. Cl. 180—219 11 Claims



1. A motorcycle comprising:

a frame body having the shape of a substantially single pipe over substantially the whole length thereof, said frame body including a first portion vertically extending, slightly forwardly inclined and having a lower end, a second portion substantially horizontally and rearwardly extending from said lower end of said first portion and having a rear end, a third portion upwardly extending from said rear end of said second portion, rearwardly inclined and having an upper end, and a fourth portion substantially horizontally and rearwardly extending from said upper end of said third portion;

a head tube rigidly secured to said first portion of said frame body, a front fork turnably supported by said head tube, and a front wheel rotatably supported by said front fork;

a floor mounted on said second portion of said frame body;

a front shield mounted on said first portion of said frame body, said front shield comprising a head lamp housing located forwardly of said head tube, an auxiliary fender located immediately below said head lamp housing and intervening between said first portion of said frame body and said front wheel, said auxiliary fender having a concave front face and substantially vertically extending, a pair of leg shields located at opposite lateral sides of said auxiliary fender and downwardly extending from a location in the vicinity of said head lamp housing, said leg shields being located at opposite lateral sides of said head lamp housing, said front fork and a rear edge of said front wheel, and a pair of foot rests extending substantially horizontally and rearwardly from respective ones of said leg shields into a level flush with said floor, said front shield comprising a one-piece member formed integrally with said head lamp housing, said auxiliary fender, said leg shields, and said foot rests; and

a body cover mounted on said fourth portion of said frame body and accommodating at least one accessory of said motorcycle.

4,487,284

DEVICE FOR TOWING A MOTORCYCLE

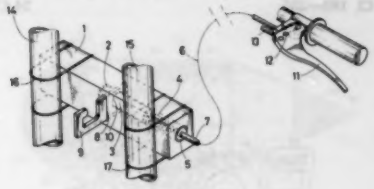
Walter Steiner, Meyrin, Switzerland, assignor to Lacoray S.A., Geneva, Switzerland

Filed Nov. 12, 1982, Ser. No. 441,296

Claims priority, application Switzerland, Nov. 13, 1981, 7297/81

Int. Cl.³ B60D *1/02*

U.S. Cl. 180—219 5 Claims



1. A device for towing a motorcycle, which comprises

a towing unit body adapted to be fastened to the front fork of the motorcycle to be towed,

a hitching member slidably fitted in said body,

a bolt retaining said hitching member in said body,

a traction cable having one end connected to said bolt and an opposite end, and

means formed on said opposite end for attachment to a traction lever.

4,487,285

ENGINE SUSPENSION SYSTEM

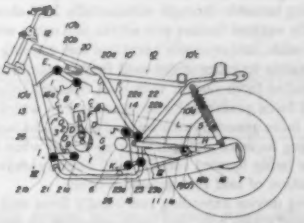
Takao Tomita, Niiza, and Yuji Kishizawa, Kawagoe, both of Japan, assignors to Honda Motor Co., Ltd., Tokyo, Japan

Filed Jan. 6, 1983, Ser. No. 455,947

Claims priority, application Japan, Jan. 12, 1982, 57-3061; Jan. 12, 1982, 57-3062

Int. Cl.³ B60K *5/12*

U.S. Cl. 180—228 14 Claims



1. An engine suspension system for suspending an engine from the body of a vehicle including a framework, comprising;

a plurality of links each having two junctions, said links each having said two junctions thereof located on corresponding one of a plurality of straight lines extending radially in different directions from a center of percussion of the engine located at a predetermined position in said body of said vehicle; a first joining means pivotally joining one junction of each of said links to said engine; and a second joining means pivotally joining the other junction of each of said links to said framework, whereby said engine is suspended for turning movement about said center of percussion to reduce the transmission of engine vibrations to said body of said vehicle.

4,487,286
TRACTOR

Cornelis van der Lely, 7 Brüschenrain, Zug, Switzerland

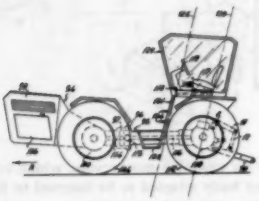
Continuation of Ser. No. 895,099, Apr. 10, 1978, abandoned, which is a division of Ser. No. 653,514, Jan. 29, 1976, abandoned. This application Apr. 15, 1983, Ser. No. 485,372

Claims priority, application Netherlands, Jan. 30, 1975, 7501075

The portion of the term of this patent subsequent to Nov. 30, 1999, has been disclaimed.

Int. Cl.³ B62D *33/006*

U.S. Cl. 180—235 **14 Claims**



1. A tractor which comprises:

an engine;

front and rear ground wheels each having pneumatic tires mounted thereon which are at least one hundred centimeters in diameter;

a frame which comprises front and rear portions, said portions being pivotable relative to one another about a substantially vertical axis located between the front and rear horizontal axes of rotation of said ground wheels, said engine being mounted only on said front portion of said frame and being operatively connected to both said front and rear ground wheels for driving same;

an operator's seat and operating controls including a steering wheel from which the tractor is steerable and controllable;

a cabin mounted on said rear portion of said frame, said cabin being substantially disposed above said ground wheels as seen in side view, said operator's seat and said steering wheel being mounted in said cabin on said rear portion of said frame higher than a horizontal plane containing the upper surfaces of said pneumatic tires and being turnable through substantially 180° about a substantially vertical further axis within said cabin which is not so turnable, said operator's seat and said steering wheel being turnable together about said further axis from a position selected from one in which an operator occupying said seat faces generally forward and one in which such operator faces generally rearward of the tractor, said seat when facing forward and said steering wheel when facing to the rear being located substantially directly above the axis of rotation of said rear ground wheels;

a lifting device extending rearwardly from said rear portion of said frame near said cabin whereby an operator in said seat when facing to the rear has a direct view of an implement attached to said lifting device.

4,487,287
SUPPORT SYSTEM FOR AUTOMOBILE POWER PLANT

Kenichi Watanabe, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 28, 1982, Ser. No. 402,577

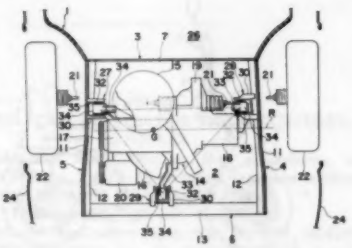
Claims priority, application Japan, Aug. 3, 1981, 56-122197; Aug. 3, 1981, 56-122198; Aug. 3, 1981, 56-122199

Int. Cl.³ B60K *5/04*

U.S. Cl. 180—297 **7 Claims**

1. A support system for an automobile power plant including an engine, a transmission and a differential, which comprises, in combination:

a housing structure forming a part of an automobile body structure and having an engine compartment defined therein, said engine compartment being defined by and surrounded by a partition wall, separating the engine compartment from a passenger compartment, a pair of opposite side walls generally extending outwardly from the partition wall in spaced relation to each other and at least one transverse frame member extending between the side walls in spaced relation to the partition wall, said power plant being mounted in the engine compartment with the axis of rotation of the engine oriented widthwise of the automobile body structure; and



first, second and third elastically yieldable bearing assemblies each having elastically yieldable connections for connecting corresponding first, second and third different portions of the power plant to the side walls and transverse frame member, respectively, said first and second bearing assemblies being positioned on one side of the center of gravity of the power plant adjacent the partition wall, said third bearing assembly being positioned on the other side of the center of gravity of the power plant remote from the partition wall, said first and second elastically yieldable bearing assemblies defining said first and second points of elastically yieldable connections and positioned such that an imaginary line, drawn between the first and second points of elastically yieldable connections, extends on one side of and generally in parallel to the natural torque axis of the power plant.

4,487,288
MUFFLER DEVICE OF MOTORCYCLE

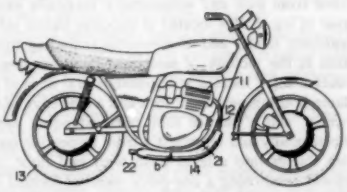
Jun-ichi Watanabe, Kobe, and Takahiko Aoyama, Akashi, both of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Japan

Filed Jun. 28, 1982, Ser. No. 392,521

Claims priority, application Japan, Jul. 3, 1981, 56-99725

Int. Cl.³ F01N *1/08*

U.S. Cl. 181—238 **5 Claims**



1. A muffler device of a motorcycle having a front and a rear wheel comprising:

a single muffler body for silencing the exhaust noise of a

multicylinder engine, said muffler body being located beneath said engine, said entire muffler body curving and projecting upwardly forward of the lower front portion of the engine;

a plurality of exhaust pipes each of which is connected proximately at one end thereof to said muffler body and each of which is connected at the other end thereof to respective cylinders of the engine;

discharge pipes connected to said muffler body to discharge the exhausts of the engine from the muffler body rearwardly of said motorcycle, said discharge pipes having a length so as to terminate forward of the rear axle; and

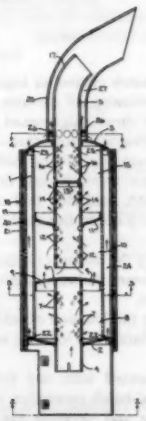
said muffler body being adapted to operate in its entirety for each exhaust from each cylinder of said engine.

4,487,289

EXHAUST MUFFLER WITH PROTECTIVE SHIELD

Kenneth J. Kicinski; Frederick H. Printiss, Sr., and Richard J. Jasensky, all of Stoughton, Wis., assignors to Nelson Industries, Inc., Stoughton, Wis.

Filed Mar. 1, 1982, Ser. No. 353,181
Int. Cl.³ F01N *1/10, 1/14*
U.S. Cl. 181—252 **11 Claims**



1. A muffler construction comprising, a muffler including an elongated vertically disposed outer tubular body, a first head enclosing one end of the body, a second head enclosing the opposite end of the body, an inlet pipe for introducing exhaust gas into the muffler, an outlet pipe for discharging the exhaust gas from the muffler, a heat insulated shell spaced radially outward of said body to provide an annular passage therebetween, said heads projecting radially beyond said body and being connected to the respective ends of said shell, a plurality of first holes disposed in the first end head and communicating with one end of said passage, and a plurality of second holes disposed in the second head and communicating with the opposite end of said passage, air being passed by convection through said first holes and said passage and being discharged through said second holes to thereby cool said body.

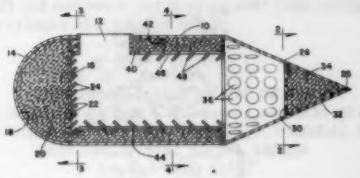
4,487,290

LIGHT AIRCRAFT ENGINE MUFFLER

William J. Flaherty, Davenport, Iowa, assignor to Mustang Units Co., Davenport, Iowa

Filed Apr. 29, 1983, Ser. No. 490,011
Int. Cl.³ F01N *1/24*
U.S. Cl. 181—256 **11 Claims**

1. A muffler for use with the internal-combustion engine of light aircraft, comprising an elongated, essentially hollow structure having a cylindrical body and front and rear end portions, said body being in the form of an imperforate cylindrical wall, said front end portion including a wall spanning and affixed to the front end of the body, one of said walls including a forward exhaust inlet leading to the interior of the structure, and said rear end portion being in the form of a cone coaxial with and having its base affixed to the rear end of the body and its apex disposed rearwardmost, said cone including a foraminous interior radial partition fixedly positioned intermediate the base and apex of the cone to form a conical chamber at the cone apex, the wall of the cone forwardly of the



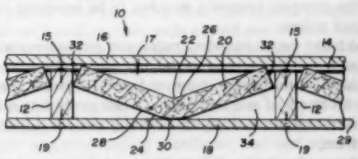
partition having a plurality of perforations therein, sound-absorbent material contained in the apex chamber, a tubular pressure-wave trap element within the cylindrical wall and extending from the exhaust inlet to the cone, said element having a peripheral wall spacedly surrounded by the cylindrical wall to provide an annular chamber between the element and the cylindrical wall, the element wall including a plurality of slots therein communicating the interior of the element with the annular chamber, and sound-absorbent material contained in the annular chamber.

4,487,291

SOUND ATTENUATING PARTITION

Keith W. Walker, Lake Zurich, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Filed Dec. 22, 1982, Ser. No. 452,221
Int. Cl.³ E04B *1/82*
U.S. Cl. 181—290 **9 Claims**



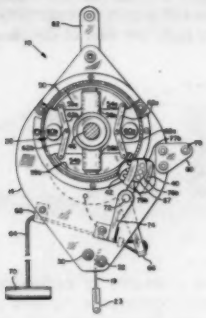
1. A parition system having enhanced sound attenuation, said system comprising a framework of spaced-apart, parallel framing members and cross members in co-planar array, a wall panel connected to said framework to form a partition having a cavity therein, and a bowed mineral fiber blanket disposed between adjacent parallel framing members within said cavity, the apex of the bow being in contact with the wall panel, said apex being located along the centerline of the blanket which is parallel to the framing members; said blanket constituting an oblique path across the partition for the dissipation of sound energy, characterized further in that a second wall panel is connected to the opposite side of the framework, a portion of the concave side of the bowed blanket is in contact with the second panel, and the lateral edges of the blanket are in contact with the adjacent parallel framing members.

4,487,292

LET DOWN APPARATUS

Franklin G. Smith, and David L. Prevost, both of Portland, Oreg., assignors to LeRoy G. Haagen, Vancouver, Wash.

Filed Jun. 10, 1982, Ser. No. 386,993
Int. Cl.[3] A62B 1/10
U.S. Cl. 182—234 11 Claims



1. An apparatus for letting a person down from a substantial height comprising:

a casing;

reel means rotatably mounted to said casing for storing an elongate extension member adapted to be connected to the person to be let down;

brake means for reducing the rate of rotation of said reel means, said brake means including a stationary brake drum and a pair of radially opposed brake shoes mounted to rotate with the rotation of said reel means;

governor means including a pair of radially inwardly articulated flyweights extending between said brake shoes, the articulation permitting said flyweights to be displaced radially outwardly as the rate of rotation of said brake shoes and said reel means increase to displace said brake shoes radially outwardly, whereby the pressure of said brake shoes against said brake drum and the resulting braking is increased as the rate of rotation of said reel. means increases;

crank means cooperable with said reel means for permitting the elongate extension member to be rewound onto said reel means;

said brake means including radial arm means associated with each said brake shoe to stabilize said brake shoe when it contacts said brake drum and prevent other than radial movement of said brake shoe, while permitting said brake shoe to move radially toward and away from said brake drum;

said pair of articulated flyweights each having opposite ends connected to said brake shoes, the ends of the one said articulated flyweight being connected to said brake shoes on a side opposite of and equidistant from the radial arm means as the ends of the other said articulated flyweight; and

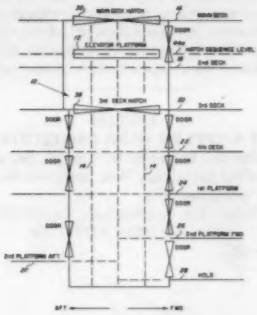
lever actuated stop means for maintaining said reel means in a wound condition even after the elongate extension member is loaded, said stop means comprising a stop mounted to rotate with said reel means and having an inclined end and abutment end, and lever means pivotally mounted to said casing for engaging the abutment end of said stop to permit said stop to be selectively released and said reel means to be unwound under load, said lever means cooperating with the inclined end of said stop to permit said reel means to be rewound without disengaging said lever means from said stop.

4,487,293

ELEVATOR/HATCH CONTROLLER PLATFORM LEVELING LOGIC WITH SAFETY FEATURES

Geoffrey O. Thomas, Bethesda, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 24, 1983, Ser. No. 478,592
Int. Cl.[3] B66B 1/18
U.S. Cl. 187—29 R 12 Claims



1. An elevator leveller/hatch controller logic circuit of the type for automatically positioning an elevator platform, said circuit having platform up, down, high-speed and low-speed outputs, connected to an elevator motor controler, for controlling the motion of said elevator platform, said elevator platform located in an elevator trunk having first and second hatches associated therewith, said first and second hatches being coupled to a dual-hatch controller, said circuit comprising:

first means for dispatching the elevator platform to a desired destination, said first means including a plurality of destination dispatch outputs;

second means for sensing the location of said elevator, said second means with a plurality of location sensing outputs; and

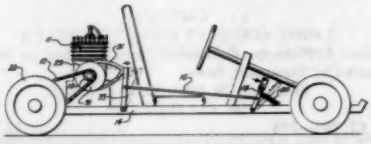
control means interconnected with said first means, said second means, said dual-hatch controller, and said motor controller, for slowing and stopping the platform if it proceeds beyond the desired destination, for activating the high speed controller only once per dispatch, for enabling the elevator platform to be dispatched only to preselected locations, and for controlling said first and second hatches such that said first and second hatches are not simultaneously open.

4,487,294

BRAKE ASSEMBLY

Joseph S. Geeck, III, 6355 Jefferson Hwy., Harahan, La. 70123

Continuation-in-part of Ser. No. 358,656, Mar. 16, 1982, abandoned, and Ser. No. 371,235, Apr. 23, 1982,. This application Aug. 13, 1982, Ser. No. 407,780
Int. Cl.[3] F16D 49/08
U.S. Cl. 188—77 R 8 Claims



1. A brake assembly for slowing or stopping rotation of

rotatable members powered by a prime mover which comprises:

(a) a rotatable shaft;

(b) at least one pulley secured to said shaft, said pulley having inwardly tapered walls adapted to accommodate a matching belt having comparable tapered sides;

(c) a belt composed of abrasion-resistant, flexible, relatively inelastic material, said belt having tapered sides comparable to the tapered walls of said pulley and being adapted to fit into and frictionally engage said pulley;

(d) means secured to said belt to prevent said belt from rotating with said pulley;

(e) engagement means for bringing said belt into frictional, rotation-slowing/stopping engagement with said pulley; and

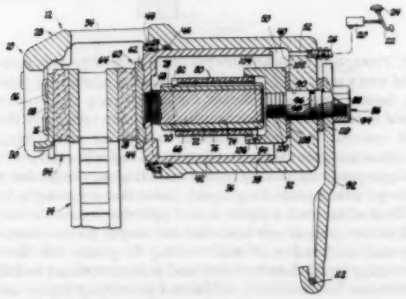
(f) means adapted to keep said belt in a tangential position relative to the pulley when the belt is being engaged with and disengaged from said pulley.

4,487,295

DISC BRAKE CALIPER WITH INTEGRAL PARKING BRAKE

Clarence I. Mitchell, Xenia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed May 27, 1983, Ser. No. 498,900
Int. Cl.³ F16D *55/224*
U.S. Cl. 188—72.6 **5 Claims**



1. In a vehicle brake assembly of the type including a disc brake caliper positioned in relation to a brake disc whereby friction pads are applied to opposite sides of the brake disc when the brakes are applied, the improvement comprising:

a piston reciprocably disposed within a cylinder contained by said brake caliper;

a threaded shaft connected to said piston and movable therewith;

a cylindrical sleeve nut threaded on said shaft;

a one-way clutch including

a first part defining a clutch inner surface on at least a portion of the outer cylindrical surface of said sleeve nut,

a second part providing selectively actuated clutch locking means received circumferentially about said first part in a normally non-gripping relation therewith so as to permit axial movements of said sleeve nut relative to said second part,

and a third part operatively connected with said second part, said third part being movable in one arcuate direction relative to said first part to lock said second part in gripping relation with said first part and being movable in the opposite arcuate direction to unlock said second part from said first part;

said clutch, while said third part is actuated to lock said second part to said first part, defining a torsional force flow path to said sleeve nut from said third part;

and means mounted on said caliper and extending into said cylinder and engaging said third part in arcuate driving relation, said means being actuatable to move said third part in said one arcuate direction to exert torsional force thereon initially to cause said second part to grip said first part and then move said sleeve nut arcuately to cause said sleeve nut to drive said threaded shaft and said piston to apply the brake, and to move said third part in said opposite arcuate direction to release the brake;

said piston being actuatable by pressure in said cylinder to move said piston to apply the brake, and in so moving said piston also moving said threaded shaft and said sleeve nut axially relative to said second part;

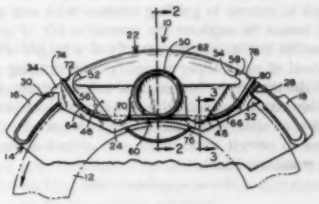
and means establishing and retaining said piston and said shaft and said sleeve nut in an adjusted brake position in the cylinder after pressure release.

4,487,296

WIRE SPRING FOR A DISC BRAKE

Peter J. Schreiner, and Bert A. Gumkowski, both of South Bend, Ind., assignors to The Bendix Corporation, Southfield, Mich.

Filed Nov. 29, 1982, Ser. No. 445,264
Int. Cl.³ F16D *65/02*
U.S. Cl. 188—73.38 **6 Claims**



1. A wire spring for a disc brake wherein a caliper is movable axially relative to a torque member to engage at least one friction element with a rotor to be braked, the one friction element being engageable with the torque member and the caliper at opposite ends of the one friction element, the caliper defining a central recess intermediate a pair of legs opposing the one friction element to bias the latter into engagement with the rotor during braking, and the wire spring extending between the one friction element and the caliper to yieldably oppose separation therebetween, characterized by said wire spring including a middle portion disposed within said central recess, a pair of arms extending from said middle portion and engagable with said opposite ends of said one friction element between said caliper and said torque member, said pair of arms cooperate with said pair of caliper legs to define an axially interlocking connection substantially limiting axial movement between said wire spring and said caliper, said pair of arms further biasing said one friction element into engagement with said caliper whereby rattling is reduced, and said wire spring middle portion engages the wall of said central recess and said pair of arms engage said one friction element to bias the latter radially inwardly into engagement with said caliper.

4,487,297

CALIPER MOUNTING SUSPENSION

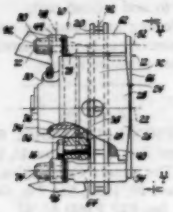
Charles T. Hoffman, Jr., Waynesville, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 7, 1982, Ser. No. 415,427
Int. Cl.³ F16D *65/02*
U.S. Cl. 188—73.45 **3 Claims**

1. A disc brake sliding caliper mount comprising:

a slidable caliper assembly having ear means extending therefrom in a plane substantially perpendicular to the axis of rotation of a disc to be braked and guide passage means formed through said ear means axially parallel to the axis of rotation;

a mounting bracket having a mounting section, adapted to be fixed and to transmit brake torque from said caliper assembly to a non-rotatable support member, and mounting bracket bridge means extending across the disc and through the plane of the disc and integrally formed with said mounting section, said bridge means having integral end means forming guide stud means extending axially through said guide passage means in guiding relation thereto so that said caliper assembly is slidably guided on



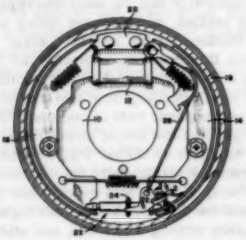
said stud means, said stud means being of sufficient axial length to remain in guiding relation with said guide passage means throughout the operation life of said caliper assembly, but terminating axially at a length which upon removal of said caliper assembly from braking alignment with the disc to be braked, said caliper assembly may be slidably moved sufficiently with respect to said mounting bracket to slide said guide passage means off of said stud means to permit removal of said caliper assembly from said mounting bracket.

4,487,298

DRUM BRAKE ASSEMBLY AND ADJUSTER THEREFOR

James K. Roberts, South Bend, Ind., assignor to The Bendix Corporation, Southfield, Mich.

Filed May 2, 1983, Ser. No. 490,275
Int. Cl.³ F16D *51/52, 65/56*
U.S. Cl. 188—79.5 GE **4 Claims**



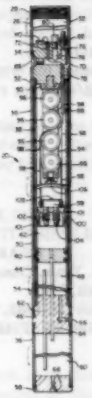
1. A drum brake assembly and adjuster therefor comprising a pair of brake shoes cooperating with the drum to brake the latter and an adjustment assembly retaining the pair of brake shoes adjacent the drum, the adjustment assembly comprising an extendible assembly between the pair of brake shoes and a pawl cooperating with the extendible assembly to extend the latter in response to lining wear of the pair of brake shoes, resilient means cooperating with the pawl to yieldably oppose movement of the pawl away from a rest position, said pawl being substantially supported by said resilient means in spaced relation to said pair of brake shoes, said resilient means including a first leg pivotally coupled to said one brake shoe and an arm slidably engageable with said one brake shoe, said leg and arm forming a loop therebetween, and said loop cooperating with said leg and arm to releasably connect said pawl to said resilient means.

4,487,299

PROTECTION APPARATUS FOR LIQUID-FILLED SUBMERGIBLE MOTORS AND THE LIKE

Russell J. Bookout, Bartlesville, Okla., assignor to TRW Inc., Cleveland, Ohio

Filed Mar. 9, 1982, Ser. No. 356,406
Int. Cl.³ F04B *21/02*
U.S. Cl. 188—313 **18 Claims**



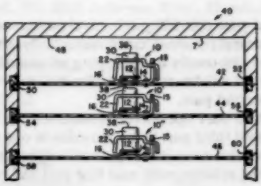
1. Protection apparatus for preventing the ingress of external fluid into a submergible equipment housing containing protecting liquid, comprising means for maintaining the protecting liquid in said housing under positive pressure relative to that of said external fluid and protector means for establishing an interface between said protecting liquid and said external fluid, said pressure maintaining means including a cylinder for containing further protecting liquid, the cylinder having a head-end and a base-end, a piston in said cylinder, means for biasing said piston toward said head-end and means for interconnecting said head-end with said housing to permit the flow of protecting liquid therebetween, said protector means including a chamber for containing additional protecting liquid, means for providing communication between said chamber and said base-end and means for providing communication between said chamber and said external fluid.

4,487,300

VIBRATION ADJUSTABLE SPACER

Robert J. Hammond, Stevensville, Mich., assignor to The Bendix Corporation, Southfield, Mich.

Division of Ser. No. 227,028, Jan. 21, 1981, Pat. No. 4,386,390. This application Dec. 6, 1982, Ser. No. 447,335
Int. Cl.³ F16F *7/10;* **H05K** *1/14*
U.S. Cl. 188—378 **4 Claims**



1. A vibration adjustable spacer comprising:
snubbing means for transferring vibrational energy from a first object to a second object by contact in order to damp the oscillations of the first object; said snubbing means being attached to the first object and operably extendible

by the vibrations in the direction of the second object in order to contact said second object at various distances; and frictionally locking collar means for cooperating with said extendible snubbing means such that movement toward the second object by the snubbing means is unopposed and retraction of the snubbing means is impeded by frictional engagement of the collar means with said snubbing means.

4,487,301

COMBINED LIVE AXLES AND DISC BRAKE ASSEMBLIES FOR VEHICLES

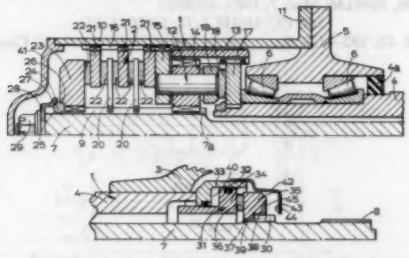
Anthony W. Harrison, Birmingham, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Oct. 30, 1981, Ser. No. 316,826

Claims priority, application United Kingdom, Nov. 4, 1980, 8035379

Int. Cl.³ B60K *41/26*; F16H *57/10*

U.S. Cl. 192—4 A **10 Claims**



1. An assembly of a combined live axle and brake for a vehicle wherein said live axle comprises a relatively stationary part including an axle tube, wheel bearings mounted on said axle tube, a hub comprising a mounting for a wheel journalled for rotation with respect to said axle tube on said bearings, a drive shaft housed within said axle tube, and means for transmitting drive from said drive shaft to said hub, wherein said brake comprises relatively rotatable friction members associated with said axle, and actuating means housed within said stationary part for applying said brake, and wherein said brake is disposed outboard of said wheel bearings, and said drive shaft is mounted in said axle tube for limited movement in an axial direction in order to transmit a brake-applying force to said brake from said actuating means, said drive shaft being provided with first means for receiving said brake-applying force from said actuating means, and second means for transmitting said brake-applying force to said brake.

4,487,302

PARKING LOCK ARRANGEMENT FOR CONTINUOUSLY VARIABLE V-BELT TRANSMISSION

Yoshiro Morimoto, Yokosuka; Sigeaki Yamamuro, Zushi; Hiroyuki Hirano, Yokosuka, and Yoshikazu Tanaka, Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Apr. 13, 1982, Ser. No. 367,924

Claims priority, application Japan, Apr. 21, 1981, 56-59276; Apr. 21, 1981, 56-59277

Int. Cl.³ B60K *41/26*

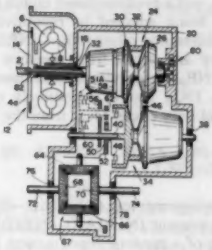
U.S. Cl. 192—4 A **4 Claims**

1. A continuously variable V-belt transmission comprising:

a case;

a continuously variable V-belt transmission unit mounted within said case, said continuously variable V-belt transmission unit having a V-belt running over a drive pulley and a driven pulley, each having cylinder chamber and two conical discs, one conical disc of the drive pulley being secured to a drive shaft, one conical disc of the driven pulley being secured to a driven shaft, the other conical disc of the drive pulley being controllably movable in an axial direction of the drive shaft in response to the fluid pressure in the cylinder chamber thereof, the other conical disc of the driven pulley being controllably movable in an axial direction of the driven shaft in response to the fluid pressure in the cylinder chamber thereof;

a differential;



a manual shift lever having a parking position and a forward drive range position;

a rotary member in driving connection with said differential;

clutch means for establishing a driving connection between said rotary member and said continuously variable V-belt transmission unit;

a parking gear rotatable with said rotary member; and

means for locking said parking gear when said manual shift lever is set to the parking position.

4,487,303

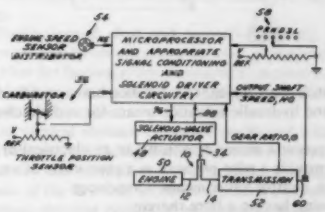
AUTOMATIC TRANSMISSION START-UP CLUTCH CONTROL SYSTEM

Elias T. Boueri, Farmington Hills, and Dennis C. Huntington, Canton, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 27, 1982, Ser. No. 453,302

Int. Cl.³ B60K *41/28*

U.S. Cl. 192—0.052 **6 Claims**



1. A system for controlling the engagement and disengagement of a clutch adapted to driveably connect an engine to the automatic transmission of an accelerating vehicle comprising:

means for producing a signal that represents the current rotational speed of the engine, NE_c;

means for producing a signal that represents the position at which the engine throttle is set;

a hydraulically actuated clutch for driveably connecting the engine shaft to the input shaft of the transmission;

a solenoid operated valve that opens and closes communication between a source of pressurized fluid and the clutch and between atmosphere and the clutch, whereby the

clutch is pressurized and vented as the solenoid is energized and deenergized;

computing means for repetitively computing at frequent intervals the duty cycle of the solenoid, being provided with a data base that includes the values of the proportional gain of the system, KP, the derivative gain of the system, KP, the engine idle speed, NEIDLE, the engine speed at which the engine produces maximum torque corresponding to the current engine throttle setting, $NEMAX_c$, and a predetermined clutch slip, S, the computing means being adapted to repetitively calculate current speed difference values $[NE_c-(NEIDLE-S)]$, to store in memory and recall from memory the previous engine speed, NE_p, the previously calculated solenoid duty cycle values, DC_p, and to repetitively calculate the current solenoid duty cycle, DC_c, from the relationship

$$DC_c=DC_p-KP[NE_c-(NEIDLE-S)]+KD(NE_c-NE_p);$$

means for incrementing (NEIDLE−S) at frequent intervals by the amount $(NEMAX_c-NEIDLE)/T$ where T is a portion of a predetermined period for increasing engine speed from NEIDLE to NEMAX; and

means for converting the current solenoid duty cycle to an analog current pulse that is applied to the solenoid.

4,487,304

CONTROL SYSTEM FOR A FLUID PRESSURE ENGAGED CLUTCH

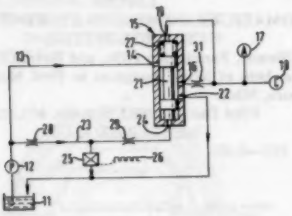
Alastair J. Young, Kenilworth, England, assignor to Automotive Products plc, Leamington Spa, England

Filed Jun. 11, 1982, Ser. No. 387,426

Claims priority, application United Kingdom, Jun. 25, 1981, 8119698

Int. Cl.³ F16D *25/14*

U.S. Cl. 192—85 R **3 Claims**



1. Clutch control means for location between a fluid pressure source and hydraulic actuation means for said clutch and comprising:

pilot pressure means responsive to an electrical drive signal to provide a pilot pressure as a proportion of source pressure; control valve means comprising:

a housing having a bore therein;

a valve spool slidably in the bore;

an inlet port in said housing for connection to said source and selectively openable to the interior of the valve by sliding movement of said spool;

a drain port in said housing selectively openable to the interior of the valve by sliding movement of said spool;

an outlet port in said housing for connection of said actuation means to the interior of the housing and thereby selectively connectable to said inlet and drain ports in response to sliding movement of said spool;

a pilot port in said housing connected to said pilot pressure means for supplying pilot pressure to said spool for moving the spool to tend to open the inlet port and close the drain port;

a feedback port in said housing such that a feedback pressure is applied to the spool to tend to open the drain port and close the inlet port;

a connection for fluid flow leading from the outlet port to said hydraulic actuation means;

a fluid flow restriction in said connection; and

a feedback passage leading to said feedback port from said connection after said restriction such that said feedback port is supplied with pressure from said outlet through said restriction.

4,487,305

APPARATUS, ESPECIALLY PORTABLE APPARATUS, FOR HANDLING TUBULAR- AND/OR ROD-SHAPED WORKPIECES OR THE LIKE

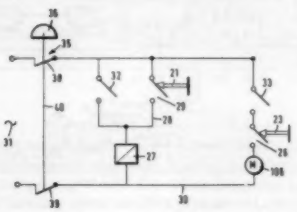
Rudolf Wagner, Stuttgart, Fed. Rep. of Germany, assignor to REMS-WERK Christian Föll und Söhne GmbH & Co., Waiblingen, Fed. Rep. of Germany

Filed Dec. 22, 1981, Ser. No. 333,288

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1980, 3049136; Mar. 7, 1981, 3108692

Int. Cl.³ H01H *3/14*; G05G *1/14*

U.S. Cl. 192—129 A **17 Claims**



1. An apparatus including a motor subject to interruption of power for handling workpieces that are movable, said apparatus comprising:

a means for chucking said movable workpieces during machining thereof;

a switching device operatively associated with the motor;

a foot pedal, said switching device being accommodated in said foot pedal;

a foot lever provided in said foot pedal for actuating said switching device; and

a restart arrestor operatively associated and built-in directly with said foot pedal and said switching device rather than with said apparatus including the motor for preventing unintentional restarting thereof following correction of a power failure.

4,487,306

BILL-DISCRIMINATING APPARATUS

Manabu Nao, Ebina; Mitsuru Takayasu, Tama, and Shyuetsu Oikawa, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jul. 20, 1982, Ser. No. 400,014

Claims priority, application Japan, Jul. 24, 1981, 56-116089

Int. Cl.³ G07F *7/04*

U.S. Cl. 194—4 C **8 Claims**

1. A bill-discriminating apparatus, including a frame having a slot defining a passage which has an input end through which a bill is conveyed, for discriminating a conveyed bill by comparing patterns read from the bill with standard patterns, said bill discriminating apparatus comprising:

means for reading patterns from the conveyed bill;

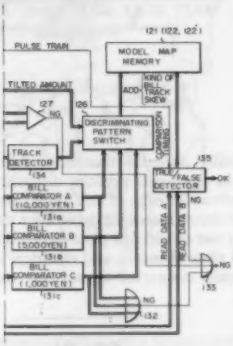
one or more sensors, operatively connected to said means for reading patterns, for determining the conveyance condition of the bill;

means, operatively connected to said one or more sensors, for generating the standard patterns corresponding to the

conveyance condition of the bill and the denomination of the bill by dividing a predetermined area of the bill into sections, said means comprising:

a model map memory for storing the standard patterns provided by said means for generating the standard patterns; and

zone address-selecting means, operatively connected to said model map memory, for supplying address data to said model map memory in order to read out the standard patterns corresponding to the conveyance condition of the bill and denomination of the bill, said zone address-selecting means generating said address data in



dependence upon information concerning the conveyance condition of the bill, including the amount of tilt of the bill, information regarding the width of the bill, deviation of the bill in the passage in the direction of a line perpendicular to the direction of the conveyance of the bill, the conveyance speed of the bill, and the denomination of the bill; and

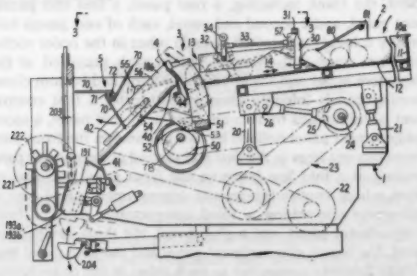
means, operatively connected to said means for reading patterns, for comparing the patterns read from the bill with the standard patterns, thereby discriminating the denomination of the bill and whether the bill is real or counterfeit.

4,487,307

PEAR ORIENTING APPARATUS

Konrad E. Meissner, Lafayette, and Marvin F. Quay, Concord, both of Calif., assignors to Atlas Pacific Engineering Company, Emeryville, Calif.

Filed Jul. 14, 1982, Ser. No. 398,065
Int. Cl.³ B65G 47/24
U.S. Cl. 198—394 **7 Claims**



5. A pear orientating apparatus comprising

(c) at least one inclined delivery chute having a longitudinal axis, an entrance end and a discharge end;

(d) a pair of spaced guide plate ears extending upwardly from the entrance end of the chute and having top ends that diverge upwardly and outwardly from the chute longitudinal axis; and

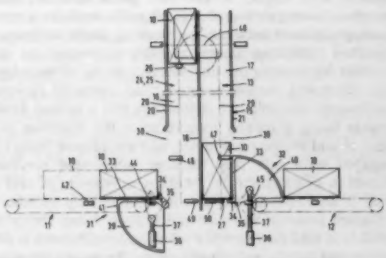
(e) a lifter having a stem-end receiving central channel aligned with the spacing between said ears for carrying singulated pears upwardly adjacent the guide plate ears and tumbling them over the top ends of the ears onto the chute.

4,487,308

APPARATUS FOR THE TRANSPORT OF PACKS

Heinz Focke, and Klaus Haenel, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co., Verden, Fed. Rep. of Germany

Filed Jun. 10, 1982, Ser. No. 387,126
Claims priority, application Fed. Rep. of Germany, Jul. 16, 1981, 3128131
Int. Cl.³ B65G 25/04
U.S. Cl. 198—412 **7 Claims**



1. An apparatus for the transport of articles, especially large packs, in connection with packaging machines, said apparatus comprising:

longitudinally spaced, first and second oppositely driven horizontal conveyors at a common level, in line and facing each other for feeding articles towards each other and into the space between the facing ends of the first and second horizontal conveyors,

an endless vertical elevator conveyor positioned within the space between the facing horizontal conveyors to define two side by side vertical conveyor tracks extending across the ends of the first and second horizontal conveyors,

said vertical elevator conveyor including engaging pieces spaced from each other and movable to underlie and engage articles moving off the horizontal conveyors towards said conveyor tracks from opposite sides of said vertical elevator conveyor and for supporting said articles for movement vertically upwardly within said conveyor tracks,

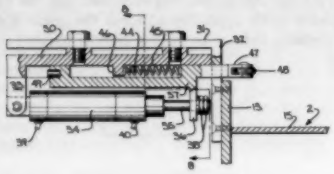
means for effecting alternating rotational movement of said endless vertical elevator conveyor, such that said articles are moved as received alternately from said first and second horizontal conveyors at said first level to a second raised level on said vertical elevator conveyor, and

means for removing said articles from said conveyor tracks from said endless vertical elevator conveyor at both conveyor tracks at said second level.

4,487,309
CONVEYOR SYSTEM

Wolfgang C. Dorner, Oconomowoc, Wis., assignor to Dorner Mfg. Corp., Hartland, Wis.

Filed Jan. 7, 1982, Ser. No. 337,590
Int. Cl.[3] B65G 37/00
U.S. Cl. 198—491 7 Claims



1. In a conveyor system, a conveyor including a moving endless conveyor member, a plurality of pallets to carry workpieces and movable on said conveyor member, a stop assembly disposed adjacent the conveyor member and including a stop member movable between an extended obstructing position where the stop member is disposed above the conveying member to a non-obstructing retracted position, guide means for guiding the stop member in movement between said positions, said guide means including a fixed first guide member and a second guide member connected to said stop member and slidable with respect to said first guide member, said guide members having mating elongated guide surfaces, a row of ball bearings located between said mating guide surfaces, power operated retracting means operably connected to said stop member for moving the stop member to the retracted position, said retracting means being a fluid operated reciprocating mechanism movable in a first stroke and a second stroke, said strokes being generally transverse to the direction of movement of said conveyor member, said mechanism being operable engaged with said stop member when said mechanism is moved in said first stroke whereby movement of said mechanism in said first stroke will move said stop member to the retracted position and said mechanism being freely slidably relative to said stop member when said mechanism is moved in the second stroke, and biasing means for urging the stop member toward the obstructing position, whereby the leading end of a pallet in the direction of movement of the pallet on the conveying member is adapted to engage said stop member when said stop member is in the obstructing position to hold the pallet against movement on the moving conveyor member, movement of the retracting means through the first stroke effecting release of the pallet, movement of the retracting means through the second stroke causing the stop member to be biased against the longitudinal side of the released pallet until said released pallet has passed the stop member, whereupon the biasing means urges the stop member into the obstructing position to thereby engage the leading end of a subsequent pallet.

4,487,310
METAL DETECTOR DEVICE FOR AUGER FEED GRANULATORS

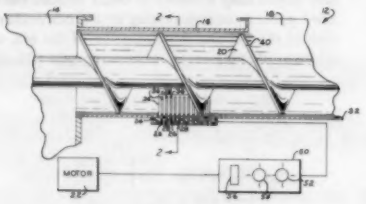
David E. Sansoucy, Whitinsville, Mass., assignor to Polymer Machinery Corporation, Berlin, Conn.

Filed Jun. 18, 1982, Ser. No. 389,687
Int. Cl.[3] B65G 43/00
U.S. Cl. 198—524 10 Claims

1. In an auger feed granulator for plastic material having a feed hopper, a cutting chamber, an auger trough connecting the hopper to the chamber, an auger rotatably mounted within the trough for transporting material from a feed hopper to the cutting chamber and a motor means for rotating said auger, the improvement comprising a metal detector device associated with said trough comprising

a plurality of first conductive plate elements in spaced-apart disposition axially along the bottom portion of said auger trough, said first plate elements having upper portions disposed adjacent the outer circumferential edge of said auger,

a plurality of second conductive plate elements in spaced-apart disposition axially along the bottom portion of said auger trough with each said second plate element being disposed between adjacent pairs of first plate elements and



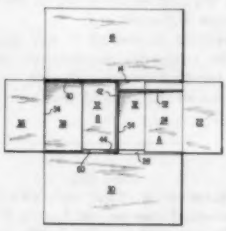
electrically insulated therefrom, said second plate elements having upper portions disposed adjacent the outer circumferential edge of said auger, and

electrical circuit means for detecting a metal object contacting any one of said first plate elements and any one of said second plate elements, said electrical circuit means being electrically connected to said first and second plate elements.

4,487,311
DUAL COMPARTMENT DISPLAY CARTON

John J. Lavery, Chicago, Ill., assignor to International Paper Company, New York, N.Y.

Filed Apr. 14, 1983, Ser. No. 484,808
Int. Cl.[3] B65D 25/00
U.S. Cl. 206—43.31 5 Claims



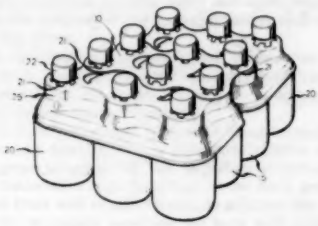
1. A one piece blank for forming a display carton, the blank formed of foldable stiff and resilient material such as paperboard, the blank including, a rear panel, a first end panel, a front panel, and a second end panel, each of said panels being serially foldably connected to each other in the order recited, the front, rear, and two end panels each provided at their respective upper and lower edges with top and bottom closure forming panels foldably connected thereto, a first compartment panel defined by two cut lines in an end panel, a second compartment panel defined by two cut lines in the front panel, respective cut lines in the first and second compartment panels meeting at a fold line between the front panel and that end panel which carries the second compartment panel, the improvement comprising, a third compartment panel, a fourth compartment panel, and a glue panel, the third compartment panel, the fourth compartment panel and the glue panel being serially foldably connected to each other in the order recited, the third compartment panel being serially connected to the said second end panel, the first and second compartment panels adapted to partially define a first product cell, the third and

fourth compartment panels adapted to partially define a second product cell and the fourth compartment panel being adapted to be in surface contact with and affixed to at least a portion of the second compartment panel when the blank is folded and glued to form a tube type container closed at its top and bottom and being in the general form of a parallelepiped.

4,487,312
PACKAGE FOR CARRYING TWO MULTICONTAINER PACKS

James E. Heider, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 10, 1983, Ser. No. 474,075
Int. Cl.³ B65D *75/00, 75/28, 71/00*
U.S. Cl. 206—158 **10 Claims**

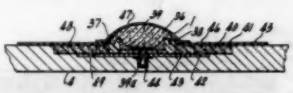


1. A package comprising a first and a second multi-container pack and a thermoplastic connector therefor, each multi-container pack comprising at least four containers, each container having a top finish, a top carrier for engaging the finish of each container in each of the first and second packs, the connector having means for hand carrying the package, the connector being substantially planar and engaging each at least two finishes of the containers in each pack to provide a stable portable package, the connector having openings to engage and receive the container finishes, each opening having a plurality of fingers around its circumference projecting inwardly to engage and grasp the container finish, the number of containers in the multi-container packs being twice the number of openings in the connector.

4,487,313
ENCLOSED MOIST PAD ASSEMBLY WITH REMOVABLE COVER

Clyde P. Repik, and Alfred F. Leatherman, both of Columbus, Ohio, assignors to William C. Heller, Jr., Milwaukee, Wis.

Division of Ser. No. 234,517, Feb. 20, 1981, Pat. No. 4,380,484.
This application Apr. 11, 1983, Ser. No. 483,905
Int. Cl.³ B65D *85/70;* **A61B** *5/04*
U.S. Cl. 206—205 **1 Claim**

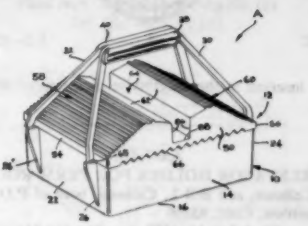


1. A multiple part assembly including an enclosure for a moist pad member, comprising a cup-shaped container, heat seal means securing the outer edge of said moist pad member in the container, a support means secured to and encircling said container and including an annular backing member encircling said open end of said container and adhesively affixed and peelable from said support means, a plastic film cover overlying said pad member and adjacent portion of the backing member, and an encircling fusion seal joining said plastic film cover to said backing member for removal of said cover with said backing member.

4,487,314
TIRE CHAIN CONTAINER APPARATUS

Robert T. Stewart, Redmond, Wash., assignor to Wink Corporation, Lynnwood, Wash.

Filed Jan. 24, 1983, Ser. No. 460,262
Int. Cl.³ A44B *7/00*
U.S. Cl. 206—216 **37 Claims**



1. A tire chain container apparatus comprising:

(a) a container casing formed of a plastic material and having an interior chamber sized to receive tire chains for the wheels of a vehicle and said container casing having an open end thereof,

(b) a cover formed of a plastic material for said casing and adapted to be removably disposed on said container casing over the open end thereof, said cover having an upper wall capable of receiving a vehicle wheel with a tire and which cover is adapted to support the weight of the vehicle carried by that wheel and tire, a pair of opposed ramps on said cover on opposite sides thereof and leading to said upper wall, a pair of opposed side walls extending between and connecting said ramps and upper wall, said upper wall having a recess therein to receive a portion of a tire chain so that when a vehicle wheel is driven onto said upper wall, the portion of the chain in said recess can be fastened around a portion of the tire on the vehicle wheel, said cover having an interior region with a plurality of longitudinally extending ribs integral with said cover and extending from each of said ramps, and a plurality of transversely extending ribs integral with said cover and extending between each of said side walls to reinforce said cover to thereby enable it to support the portion of weight of a vehicle carried by a vehicle wheel and tire when on said upper wall, said recess on its underside also being reinforced with a strut forming wall extending at least around the periphery of the surface area of the recess.

4,487,315
TUBE ASSEMBLY FOR INTEGRATED CIRCUITS

Tadashi Azuma, Kanagawa, Japan, assignor to Fujimori Kogyo Co., Ltd., Japan

Filed Feb. 24, 1983, Ser. No. 469,450
Int. Cl.³ B65D *73/02, 85/42*
U.S. Cl. 206—334 **9 Claims**

1. A tube assembly for integrated circuits, wherein a transparent conductive layer is applied to at least one side of a transparent cylindrical member formed of a synthetic resin, a rail member formed of a conductive synthetic resin and including an upper flat portion is inserted through, and comes in close contact with the said cylindrical member in such a manner that it is movable only in the lengthwise direction of the said cylindrical member, and two grooves are formed in the said upper flat portion along the full length of the said rail

member, in the lengthwise direction of the said rail member, through which grooves both terminals of the said circuits are

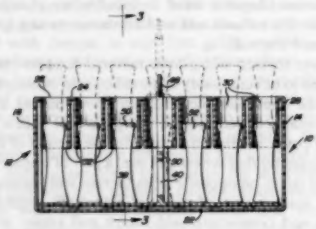
slidingly inserted in the lengthwise direction of the said rail member.

4,487,316

ELEVATOR HOLDER FOR PERM RODS

Tom L. Calhoun, and Bill L. Calhoun, both of P.O. Box 447, Buttonwillow, Calif. 93206

Filed Jul. 14, 1983, Ser. No. 514,141
Int. Cl.³ B65D *85/20, 85/62, 83/02*
U.S. Cl. 206—443 **3 Claims**



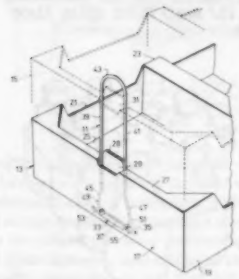
1. In combination with a plurality of elongated perm rods, a holder for said perm rods, said holder including body means defining a plurality of upwardly opening cavities downwardly into which said perm rods are lengthwise received, support and elevator structure mounted from said body means below said openings for vertical shifting relative to said body means between upper and lower limit positions, said support and elevator structure including portions thereof defining vertically shiftable floor portions for said cavities against which the lower ends of said perm rods are abutted for support within said cavities, said perm rods including upper ends projecting upwardly outwardly from the upper ends of said cavities when said support and elevator structure is in said upper position and which are at least substantially recessed downwardly within said cavities when said elevator structure is in said lower position, said body means comprising a hollow housing including a top wall and a plurality of open bottom upwardly opening receivers supported from said top wall and opening upwardly therethrough, said receivers including lower end transverse slots disposed within said housing below said top wall, said support and elevator structure comprising a grid including parallel grip bars upwardly slidably receivable within said slots and abuttable against those portions of said receivers defining the upper limits of said slots to define said upper limit position, said top wall including a central opening, said grid including a central upstanding shank portion aligned with said opening, the upper end portion of said shank portion including an upward extension supported therefrom for angular displacement about an upstanding axis, said extension being slidably received through said central opening, said extension including a lower end crossbar, said central opening comprising an elongated slot through which said crossbar is receivable when said crossbar extends lengthwise of said slot and said support and elevator structure is in said upper limit position, said extension being rotatable to a position with said crossbar disposed transverse to said slot when said crossbar is spaced above said top wall.

4,487,317

STACKING WIRE FOR PRODUCE TRAYS

Robert C. Sanderson, Buffalo, N.Y., assignor to Better Wire Products, Inc., Buffalo, N.Y.

Filed Sep. 27, 1982, Ser. No. 424,504
Int. Cl.³ B65D *5/46*
U.S. Cl. 206—509 **10 Claims**



1. A stacking wire for stackable produce trays and the like which comprises a unitary length of wire bent so as to form an elongated opened "U" shape with a pair of sides thereof joined together at an upper end and diverging from said end to open ends, at which both sides are bent outwardly to form further outwardly diverging legs which are at an angle of at least 20° with respect to continuations of the wire sides and which terminate in hook-shaped feet, with the hook openings facing outwardly and with the ends of such hooks bent upwardly, so that when the wire is installed in a produce tray, by being sequentially inserted up through a slotted bottom opening and a slotted top opening in such tray, it will be compressed so that the sides thereof are essentially parallel and so that the hook-shaped feet of the wire are held in place with respect to the bottom slot of the produce tray and have the ends thereof digging into such tray bottom.

4,487,318

BAG DISPENSING PACKAGE

Ralph M. Roen, Longview, Tex., assignor to T. C. Manufacturing Co., Kilgore, Tex.

Filed Dec. 7, 1981, Ser. No. 329,825
Int. Cl.³ B65D *85/62, 33/36*
U.S. Cl. 206—554 **8 Claims**

1. In a bag dispensing package that includes a stack of flexible bags of like quadrilateral marginal configuration that are of substantially the same size and that are in substantially superposed coincident relation throughout the stack, with each bag including a closed lower end and and open upper end and comprising a front wall and a back wall for the bag that are joined along the sides and lower end of the bag to define the bag pocket and that are free of connection along the upper bag end to provide the opening to the bag pocket there between,

and with the back wall of each bag having an extension at the bag upper end that projects upwardly of the bag and beyond the bag opening, and the front wall of each bag at the open end of the bag defining a downwards directed flap that is exterior of the bag and defines an edging that is directed toward the bag lower end and away from the bag opening, and with said extensions of the respective bags being of substantially the same size and said flaps of the respective bags being of substantially the same size, wherein the stack includes at least one group of said superposed bags that have their extensions and flaps in substantially congruent relation, and a closed receptacle in which the stack of bags is received and including front and back walls that are in substantially coextensive relation and that substantially complement the marginal configuration of the stack bags, with the receptacle enclosing the stack and said bag group being adjacent the receptacle front wall with the front walls of the bags thereof facing the receptacle front wall, and the receptacle defining upper and lower ends corresponding to the positions of the upper and lower ends of the bags of said bag group,

the improvement for permitting consecutive bags of the stack group to be simultaneously withdrawn from the receptacle and opened as they are so withdrawn,

said improvement comprising:

said front wall of said receptacle being formed to define an access opening that is positioned relative to said stack group to expose the flap, including its said edging, of the consecutive uppermost bags of the stack group,

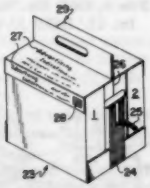
said front wall of said receptacle adjacent the upper end of the receptacle overlying the back wall extensions of the bags of said bag group continuously across the upper end of the receptacle down to approximately the position of the openings of the respective bags of said group for shaping said receptacle front wall to define a receptacle front wall lip portion behind which the back wall extensions of the bags of said bag group lie,

wherein the bags of the stack group may be consecutively withdrawn from the receptacle and simultaneously with each withdrawal opened by the user using one hand, with regard to the uppermost bag of the stack group, to reach under the exposed edging of the flap thereof, grip the flap between the hand thumb and forefinger, and pull such uppermost bag outwardly of the receptacle through the access opening, with the drag of the said extension of such uppermost bag against said lip portion and the pulling action on the flap thereof outwardly of the access opening, effecting opening of the bag.

4,487,319
CORRUGATED CARDBOARD CONTAINER HAVING A PAPERBOARD TOP AND HANDLE

Marshall J. Barrash, Atlanta, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.

Filed Jun. 18, 1980, Ser. No. 160,478
Int. Cl.³ B65D *5/54, 5/32*
U.S. Cl. 206—602 **31 Claims**



1. A package comprising:

a box having only sides and a bottom; and

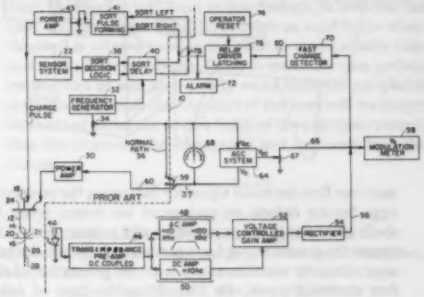
a top including a handle flap portion, a top cover portion, and a pair of securing edge portions, said securing edge portions being adhesively fastened to the top portions of two opposite box sides, said opposite box sides having substantially planar surfaces;

the sole cover of said box consisting of said top.

4,487,320
METHOD OF AND APPARATUS FOR DETECTING CHANGE IN THE BREAKOFF POINT IN A DROPLET GENERATION SYSTEM

Robert E. Auer, Miami, Fla., assignor to Coulter Corporation, Hialeah, Fla.

Filed Nov. 3, 1980, Ser. No. 203,121
Int. Cl.³ B07C *5/342*
U.S. Cl. 209—3.1 **20 Claims**



1. In an apparatus for analyzing and sorting particles suspended in a liquid wherein a liquid jet stream is produced and vibrations applied thereto in order to produce undulations on the surface of said stream and subsequent breakup of the jet stream into droplets which are collected downstream, the method which comprises sensing the amplitude of undulation on the surface of an uninterrupted portion of said jet stream by radiation which is scattered by said stream during its analyzing and/or sorting mode at a fixed point on said stream prior to the breakpoint region of said stream and automatically controlling the intensity of the vibrations applied to said stream in response to a change in said amplitude of undulation at said fixed point in such direction as to restore said amplitude of undulation at said fixed point to its original state, to thereby prevent drift in said breakup point.

4,487,321
ARTICLE CODING AND SEPARATING SYSTEM

George N. Bliss, Franklin, Mich., assignor to Diamond Automations, Inc., Farmington Hills, Mich.

Filed Jul. 1, 1982, Ser. No. 394,444
Int. Cl.³ A01K *43/04;* **B07C** *9/00*
U.S. Cl. 209—510 **36 Claims**

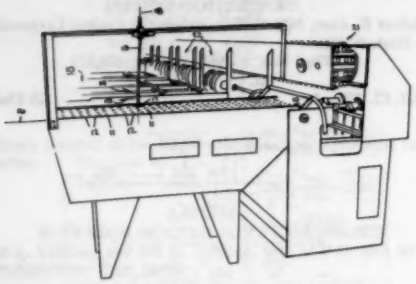
15. In an egg candler by which defects such as blood spots, dirt stains, rough spots and shell cracks of individual eggs of a mass of eggs being processed are detected, said system including movable spool bar means for conveying eggs through said candler in spaced-apart, aligned relationship, and means for generating high intensity light beneath said spool bar means and said eggs for enabling visual detection of said defects as said eggs are conveyed through said candler by said spool bar means, the improvement comprising,

elongated movable pointer means having its upper end pivotally mounted above said spool bar means and adapted for pivotable movement in mutually orthogonal directions within a selected area of said candler over said spool bar means, one of said directions being parallel to the longitudinal axis of said spool bar means and the other of said directions being perpendicular thereto,

said pointer means having the vertical lower end thereof disposed adjacent said spool bar means and being further

adapted for axial movement along the longitudinal axis thereof so that said vertical lower end of said pointer means is movable into and out of engagement with the shells of eggs disposed within said selected area of said candler,

said pointer means further including means for generating at



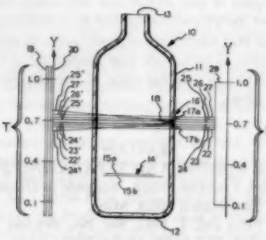
least one first electrical signal for indicating the position of eggs having defects on said spool bar means when the shells of said eggs are engaged by said pointer means, and means for generating at least one second electrical signal, approximately simultaneously with the generation of said first electrical signal, for identifying the type of defect detected in said eggs engaged by said pointer means.

4,487,322

METHOD FOR INSPECTING GLASS CONTAINERS

John W. Juvinall, Ottawa Lake, Mich., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Sep. 27, 1982, Ser. No. 424,687
Int. Cl.³ B07C 5/342
U.S. Cl. 209—526 **6 Claims**



1. A method for detecting a refractive defect in the sidewall of a transparent container, the defect being oriented in a direction substantively transverse to the longitudinal axis of the container, comprising the steps of:

directing a filtered source of diffused light toward the sidewall of the container to provide an intensity gradient which varies in a predetermined direction relative to the longitudinal axis of the container;

sensing the intensity of light at a plurality of positions in a field-of-view aligned along a path generally parallel to said predetermined direction;

producing a plurality of pixel signals each having a magnitude corresponding to the intensity of the light sensed at each position in the field-of-view, whereby the shape of the wave train of pixel signals corresponds to said intensity gradient in the absence of a refractive defect and a detectable defect signature superimposed on said intensity gradient in the presence of a refractive defect;

analyzing the wave train of pixel signals to detect the presence of a defect signature; and

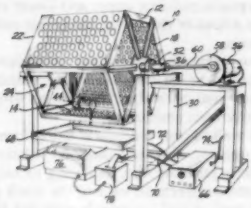
rejecting the container in response to a defect signal provided in response to a detected defect signature, whereby the defective container is sorted out from otherwise commercially acceptable containers.

4,487,323

AUTOMATIC PARTICLE-SIZE ANALYZER

Gevan R. Marrs, Puyallup, Wash., assignor to Weyerhaeuser Company, Tacoma, Wash.

Filed May 9, 1983, Ser. No. 492,920
Int. Cl.³ B07B 13/07
U.S. Cl. 209—546 **8 Claims**



1. A particle-size analyzer which comprises:

a. a polygonal drum means having a plurality of longitudinal faces on the periphery of said means;

b. a plurality of screen means mounted on the faces of the drum means for classifying a particulate sample into size groups, said screen means being successively graded from relatively smaller to relatively larger openings;

c. a door means for introducing a sample to be analyzed into the interior of the drum;

d. indexing means for successively rotating the drum about its longitudinal axis in angular increments so that each screen in turn is located as the lowermost face of the drum;

e. shaking means giving reciprocal motion along the longitudinal axis of the drum in order to agitate a sample being analyzed;

f. control means which determines shaking time for each screen means and directs the indexing means to rotate the drum to a next larger screen size after a predetermined period of shaking, and

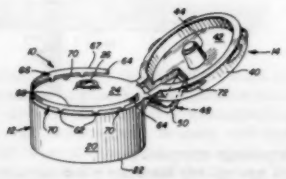
g. means for collecting successive screen fractions of the sample being analyzed.

4,487,324

TAMPER-EVIDENT DISPENSING CLOSURE

Efrem M. Ostrowsky, Highland Park, Ill., assignor to Seaquist Closures, a Division of Pittway Corporation, Crystal Lake, Ill.

Filed Feb. 8, 1984, Ser. No. 578,026
Int. Cl.³ B65D 55/02
U.S. Cl. 215—253 **20 Claims**



1. A tamper-evident dispensing closure comprising

a body adaptable to be secured to a container, a cover

hingedly connected to said body for movement between open and closed positions and means for hingedly connecting said cover and said body, a dispensing orifice defined by said body and means on said cover for sealing said orifice when said cover is in a closed position,

tamper-indicating means formed with said dispensing closure for making evident that access has been gained to said dispensing orifice,

said tamper-indicating means comprising a removable strip integrally formed with the closure and connected via frangible bridging means to one of said body and cover, said removable strip defining recess means, and projection means formed with the other of said body and cover, and said projection means extending into said recess means,

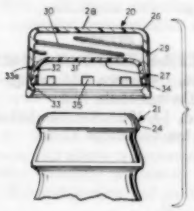
whereby when said cover is moved from said closed position towards an open position, said projection means bear against said removable strip and the cover may not readily be moved from said closed position without first severing at least a portion of said frangible bridging means.

4,487,325

CROWN CLOSURES AND CONTAINERS

Wendell D. Willingham, Milwaukee, Wis., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Jul. 6, 1982, Ser. No. 395,396
Int. Cl.³ A61B *10/00*
U.S. Cl. 215—307 **8 Claims**



1. A crown closure and container comprising

a glass container having a crown finish without threads and having an annular transfer bead spaced axially from the finish,

a closure comprising an outer shell and a separate inner cup-shaped liner,

said outer shell being made of rigid plastic and comprising a top panel, a peripheral skirt and a radially inwardly extending bead on the free edge of the skirt,

said liner being made of soft resilient plastic material and comprising a top wall, a peripheral wall and a radially outwardly extending bead on the free edge of the outer surface of the peripheral wall of the liner,

the axial extent of said peripheral skirt of said outer shell being greater than the axial extent of said peripheral wall of said liner such that the liner may be moved axially within the shell when the closure is not in position on the container,

said liner being initially positioned within said shell with said bead on said shell engaging the bottom of the bead on the free edge of the peripheral wall of the liner to retain said liner within said shell,

said closure being adapted to be applied to a container with the bead on the shell removably retaining the closure on the transfer bead,

an annular frustoconical cam surface on the inner surface of the skirt of the shell spaced from the top panel of said shell adapted to engage the radially outwardly extending bead on the free edge of the outer surface of the peripheral wall of the liner when the liner is moved axially into the shell such that when the closure is applied to the crown finish by an axial motion of the closure relative to the container, the cam surface engages the bead on the liner and the liner is forced axially into the shell, the peripheral wall of said liner is moved by the cam surface into sealing engagement with the inner surface of the upper portion of the peripheral skirt of the outer shell and the periphery of the crown finish and the free edge of the liner is moved radially inwardly by the cam surface against and locked under the crown finish on the container and the top wall of the liner engages the top of the crown finish of the container,

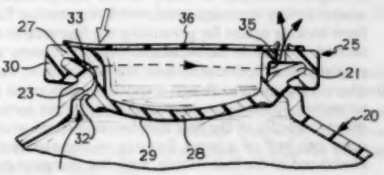
said skirt of said shell having threads on the upper end of the inner surface thereof between the cam surface and the top panel such that when the closure is applied to the container, the threads are forced into the upper portion of the peripheral wall of the liner so that when the shell is thereafter rotated in a direction to unthread the shell from the liner, the threads will form an interference fit between the liner and the crown finish to provide an axial force when the shell is rotated causing the shell to move axially relative to the liner and crown finish to move the cam surface on the skirt of said shell axially away from the peripheral wall of said liner so that the skirt of the liner will no longer be retained under the crown finish of the container permitting the closure to be disengaged and removed from the container.

4,487,326

CARBONATED BEVERAGE PACKAGE

Albert R. Uhlig, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Nov. 10, 1983, Ser. No. 550,349
Int. Cl.³ B65D *51/16*
U.S. Cl. 215—307 **35 Claims**



1. A carbonated beverage package comprising

a container having an opening with a peripheral lip defining a free edge,

said container having a downwardly and outwardly inclined sealing surface spaced from the free edge of said peripheral lip,

a closure of plastic material such that it will flex in thin cross section,

said closure having an annular wall, a radial wall engaging the free edge of the peripheral lip of the container and a transverse wall defining a convex surface facing inwardly of the container,

interengaging means between said radial wall and said container,

said closure having a downwardly and outwardly inclined integral annular sealing surface at the juncture of the axial wall and transverse wall,

said sealing surface of said closure engaging said sealing surface of said container and placing said axial wall under tension,

said closure having a pressure relief rib at the juncture of the radial wall and axial walls such that axial force in the area overlying said rib will move a portion of said annular sealing surface of said closure away from the sealing surface of said container,

said closure having a pressure relief opening through which the pressure in the container can be relieved to the atmo-

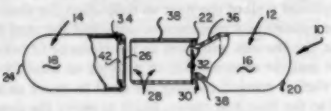
sphere such that the closure can thereafter be readily removed from the container.

4,487,327

LOCKING CAPSULE

Robert E. Grayson, Rte. 2 S. Box 2186, Great Falls, Mont. 59401

Filed Dec. 21, 1982, Ser. No. 451,844
Int. Cl.³ A61B *19/02*
U.S. Cl. 220—8 **14 Claims**



1. Locking apparatus for a capsule to be used for internal consumption, comprising, in combination:

(a) a hollow first section having an open end and a closed end;

(b) a hollow second section having an open end and a closed end and mateable at the open end thereof with the first section at the open end thereof to form an enclosure; and

(c) latching means associated with the first section and with the second section for locking the first section to the second section, the latching means including a projecting member provided on the first section and an abutment provided on the second section and arranged for lockingly engaging the projecting member, the projecting member comprising an annular flange, and the abutment being arranged extending inwardly of the second section and cooperatively interengageable with the annular flange to form locking means for permitting the first section and the second section to be separated only by forces at least partially destructive of at least the first section; and

(d) wherein the annular flange comprising a recessed portion extending toward the open end of the first section and offset inwardly of the first member, and terminating in an open one-half of a torus forming an annular facing the closed end of the first section, with the abutment comprising an anchor ring extending inwardly from an outer surface of the second section and opening toward the closed end of the second section, and being arranged for lockingly engaging with the one-half of a torus of the projecting member, the outer surface of each of the first section and the second section being cylindrical and of substantially equal diameters for matingly engaging one another.

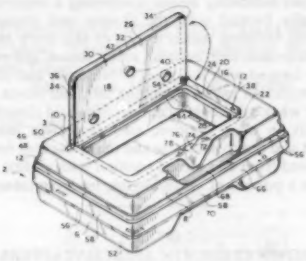
4,487,328

CONTAINER CASE

Donald G. Wilcox, Seymour, and Nobile Zambrano, Branford, both of Conn., assignors to Show-Pak, Incorporated, New Haven, Conn.

Filed Oct. 29, 1982, Ser. No. 437,640
Int. Cl.³ B65D *43/14, 51/04*
U.S. Cl. 220—241 **13 Claims**

1. A container case formed by a blow molding process which comprises a one-piece blow molded main body portion, a separate one-piece blow molded lid and hinge means for pivotally mounting said lid to said main body portion, said main body portion including top and bottom walls and side walls interposed between said top and bottom walls and interconnected thereto at corresponding peripheral edge portions thereof, said top wall having formed therein an opening for access to the interior of said main body portion, said opening being spaced inwardly from the periphery of said top wall, a portion of said top wall surrounding said opening being shaped to form a well to closely receive said lid, said lid receiving well including an inner wall projecting downwardly from said top wall of the main body portion, a seat portion projecting inwardly from said inner wall and a rim projecting downwardly from the seat portion, said seat portion being recessed below the upper surface of said top wall a distance which corresponds substantially to the thickness of said lid so that, when said lid is properly seated in said receiving well in a closed position, the



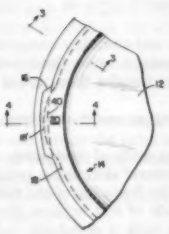
outer surface of said lid lies substantially flush with the upper surface of said top wall, at least one of the side walls of said main body portion including a base having a central portion and edge portions which mutually diverge from said central portion to increase the stability of the container case when the container case rests on said base.

4,487,329

TAMPER-EVIDENT CLOSURE

Thomas W. Winstead, Baltimore, Md., assignor to Maryland Cup Corporation, Owings Mills, Md.

Filed Oct. 13, 1983, Ser. No. 541,469
Int. Cl.³ B65D *17/40*
U.S. Cl. 220—276 **24 Claims**



1. A combination of a container and a closure, said container comprising a container rim surrounding an opening thereof and said closure comprising a closure rim cooperating with said container rim;

said container rim comprising a first seal portion and an adjacent surface;

said closure rim comprising a second seal portion for engaging said first seal portion and an adjoining surface which is substantially parallel to and engages said adjacent surface, and a tear-strip underlying at least a portion of said container for securing said closure thereto;

wherein said adjoining surface is substantially coextensive with said adjacent surface along a first circumferential part of said closure and extends beyond said adjacent surface at a second circumferential part of said closure;

said adjoining surface comprising a circumferential line of weakness for defining said tear-strip, wherein said line of weakness is juxtaposed to said adjacent surface along said first circumferential part of said closure and extends away from said adjacent surface along said second circumferen-

tial part of said closure for defining a tab portion upon removal of said tear strip.

4,487,330

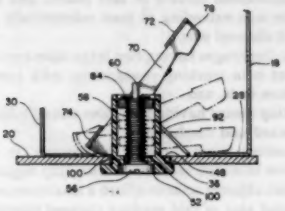
TRIM CLAMP ASSEMBLY

Dennis J. Grover, Kokomo, Ind., and David W. West, Naperville, Ill., assignors to Square D Company, Palatine, Ill.

Filed Jan. 5, 1984, Ser. No. 568,552

Int. Cl.³ B65D 45/16

U.S. Cl. 220—324 **15 Claims**



1. An adjustable clamp assembly on a cover plate for clamping the cover plate to a box having a mounting flange comprising:

a sleeve having a longitudinal axis extending outward from said cover plate, said sleeve including a plurality of slots directed in generally perpendicular relationship to said cover plate;

a screw positioned along said longitudinal axis of said sleeve;

a nut threadingly engaged with said screw, said nut including a plurality of wings extending radially outward from said longitudinal axis, each wing extending through a respective one of said slots whereby rotation of said nut with respect to said sleeve is prevented;

a clamp member pivotally associated with said nut and including a first end portion and an opposite second end portion;

biasing means for biasing said clamp member to a first position wherein said first end portion is engaged with said cover plate and said second end portion is spaced substantially away from said cover plate, said second end portion being drawn against the bias of said biasing means toward said cover plate in response to the turning of said screw which draws the nut toward the cover plate.

4,487,331

WASTE RECEPTACLE

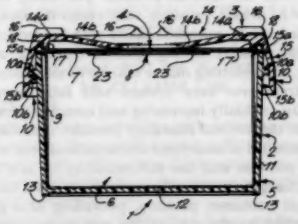
Clifford G. Hawker, 62 Union St., Ryde, Isle of Wight, England

Filed May 24, 1983, Ser. No. 497,635

Claims priority, application United Kingdom, May 25, 1982, 8215271

Int. Cl.³ B65D 25/16, 41/18

U.S. Cl. 220—405 **11 Claims**



1. A waste receptacle comprising a two-part outer housing and a disposable two-part inner waste container each having a bottom part and an apertured top part interconnectible around their perimeters, the said perimeters of the inner container parts being arranged to be received between the perimeters of the outer housing parts and sealingly interconnected by the action of interconnecting the outer housing parts.

4,487,332

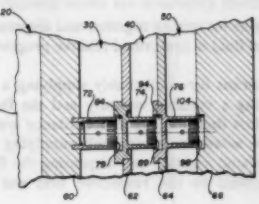
CRYOSTAT VESSEL WALL SPACING SYSTEM

Yuchi Huang, Madison, Wis., assignor to Nicolet Instrument Corporation, Madison, Wis.

Filed Feb. 2, 1984, Ser. No. 576,521

Int. Cl.³ B65D 7/22

U.S. Cl. 220—445 **13 Claims**



1. A system for spacing the walls of nested vessels in a cryostat for containing low temperature liquified gases, the system comprising:

a first vessel defined by a first vessel wall;

a plurality of first spacer stubs, each first stub having inner and outer ends defining a first stub spacing axis, and the inner end of each first stub being secured to the first vessel wall so that the first stub extends outwardly therefrom with its axis generally perpendicular to adjacent portions of the first vessel wall;

a second vessel defined by a second vessel wall and designed to surround the first vessel;

a plurality of first stub caps, each first stub cap having a recess therein and being secured to the second vessel wall with said recess axially aligned for reception of the outer end of one of the first stubs when the first and second vessel walls are at substantially the same temperature;

a plurality of second spacer stubs, each second stub having inner and outer ends defining a second stub spacing axis, and the inner end of each second stub being secured to the second vessel wall so that the second stub extends outwardly therefrom with its axis generally perpendicular to adjacent portions of the second vessel wall and coaxially aligned with the spacing axis of one of the first stubs when the first and second vessels are at substantially the same temperature;

a third vessel defined by a third vessel wall and designed to surround the second vessel;

a plurality of second stub caps, each second stub cap having a recess therein and being secured to the third vessel wall with said recess axially aligned for reception of the outer end of one of the second stubs when the second and third vessel walls are at substantially the same temperature; and

the stubs and stub caps being designed so that upon introduction of a low temperature liquified gas into the first vessel of the cryostat, thermal contaction of the vessels withdraws each spacer stub from the recess of its respective stub cap a distance sufficient to disengage said spacer stub and stub cap.

4,487,333

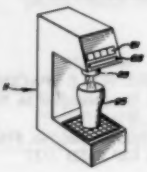
FLUID DISPENSING SYSTEM

Edwin Pounder, LaCanada; Alan J. Arena; Michael Pawlowski, both of Chino, and Adrian M. Totten, El Monte, all of Calif., assignors to Signet Scientific Co., El Monte, Calif.

Filed Feb. 26, 1982, Ser. No. 352,753

Int. Cl.³ B65B 3/04

U.S. Cl. 222—54 **27 Claims**



1. Apparatus for mixing together and dispensing a first fluid and a second fluid in prescribed relative proportions, comprising:

first valve means for controllably supplying a first fluid, the fluid having a variable viscosity and the flow rate of the supplied first fluid varying in accordance with its viscosity;

second valve means for controllably supplying a second fluid;

means for mixing together and dispensing the first and second fluids supplied by the respective first and second valve means;

means for determining the viscosity of the first fluid supplied by the first valve means, including

removable module means indicating the relationship between viscosity and temperature for the first fluid,

means for carrying the removable module means and for reading it to determine the relationship between vicosity and temperature for the first fluid, and

means for measuring the temperature of the first fluid and for transforming the temperature measurement into a corresponding viscosity determination; and

control means responsive to the viscosity determination for modulating at least one of the first and second valve means in a prescribed fashion, such that the apparatus dispenses the first and second fluids in prescribed relative proportions.

4,487,334

THRUST CONTROL MEANS MOUNTABLE IN A PRESSURIZED CONTAINER

Winfried J. Werding, 77, Av. du Général Guisan, 1009 Pully, Switzerland

PCT No. PCT/CH81/00089, § 371 Date Apr. 5, 1982, § 102(e) Date Aug. 5, 1982, PCT Pub. No. WO82/00450, PCT Pub. Date Feb. 18, 1982

PCT Filed Aug. 6, 1981, Ser. No. 369,023

Claims priority, application Switzerland, Aug. 6, 1980, 5939/80

Int. Cl.³ B67D 5/34

U.S. Cl. 222—55 **17 Claims**

1. Thrust control means adapted for being mounted in a pressurized container from the interior of which product is to be expelled along a flowpath extending through a riser tube and a discharge valve,

which thrust control means enable maintaining the amount of product being expelled from the container per unit of time at least substantially constant during the entire emptying time of said container, notwithstanding the reduction of internal pressure occuring during the progressive emptying of the container,

said thrust control means comprising

a casing,

a product channel in said casing, having a channel axis and two open ends one of which is connectable to said riser tube and the other is connectable to said discharge valve,

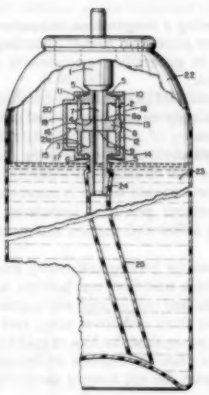
a transverse bore having a bore axis intersecting said axis of said product channel, thereby providing two intermediate openings in said product channel located in the wall of said transverse bore,

a piston having two ends and a circumferential surface therebetween and being lodged in said transverse bore for axial displacement therein, said piston having a piston bore with two piston bore openings in said circumferential surface of said piston, and with a piston bore axis extending at least substantially parallel with said channel axis,

a first diaphragm having two large sides one of which two sides is in working engagement with one of said two piston ends, and

resetting means having two sides one of which sides faces toward said diaphragm;

said resetting means holding said piston, in a fully open position in which said piston bore fully registers with said product channel so as to afford a maximum common cross sectional area of said product channel intermediate openings with said piston bore openings, and when said diaphragm is undeformed, and, when said thrust control means is mounted in a container the interior of which is pressurized,



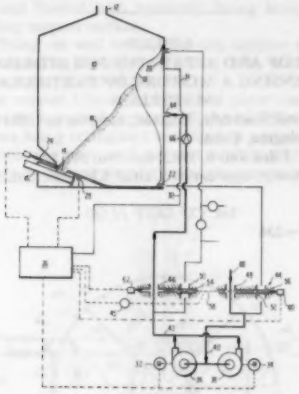
one large side of said diaphragm being adapted to be exposed to the internal pressure prevailing in the interior of said container, said diaphragm being deformed by such internal pressure, against the bias of said resetting means, whenever the internal container pressure exceeds a determined upper value, and thereby axially displacing said piston away from said fully open position and reducing the size of said common cross sectional area proportionately with the internal pressure prevailing in said container to which pressure said other diaphragm side is exposed, while, proportionately with the reduction of said internal pressure during gradual emptying of the container, said resetting means will move said piston axially in said transverse bore toward said fully open position, thereby gradually increasing said common cross sectional area as the internal container pressure decreases,

the dimensions of said common cross sectional area at fully open position and the deformability of said diaphragm with changing pressure being so chosen that the size of the internal container pressure, prevailing at a given time, multiplied by the size of the respective common cross sectional area at that pressure affords an at least substantially constant value throughout all of the operations required for emptying the container of product.

4,487,335
VALVE ASSEMBLY AND CONTROL SYSTEM FOR MATERIAL HANDLING AND STORAGE BIN

Timothy C. Bonerb, Buffalo, N.Y., assignor to Vincent C. Bonerb, Boston, N.Y.

Filed Feb. 11, 1983, Ser. No. 465,797
Int. Cl.³ B65D *88/16, 88/62*
U.S. Cl. 222—57 12 Claims



1. In a system for handling, storing, and discharging free-flowing granular material, the system being of the type having a dual wall cup-shaped inflatable bag for storing and discharging the material, and a fan means for inflating and deflating the bag, an improved valve and control assembly comprising;

(a) a pair of inlet conduits connected to the intake of the fan means, one of the inlet conduits also connected to the interior of the inflatable bag for deflating the bag, and the other of the inlet conduits in communication with the atmosphere,

(b) two outlet conduits connected to the outlet of the fan means, one of the outlet conduits in communication with the atmosphere, and the other of the outlet conduits connected to inflate the bag,

(c) a unitary valve assembly including valve means controlling high-volume, low-pressure flow from the fan means through the pair of inlet and the pair of outlet conduits by allowing flow through one of the inlet and one of the outlet conduits in one position of the valve means while blocking flow through the other of the conduits, and by allowing flow through the other of the inlet and other of the outlet conduits in another position of the valve means while blocking through the one of the inlet and one of the outlet conduits.

4,487,336
SYRINGE CLOSURE ASSEMBLY WITH ATTACHABLE NOZZLE

Vincent R. Sneider, 3422 Hallcrest Dr., Atlanta, Ga. 30319

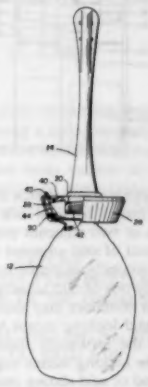
Filed Jun. 1, 1982, Ser. No. 384,096
Int. Cl.³ A61M *1/00*
U.S. Cl. 222—107 7 Claims

1. A syringe closure assembly with retaining means for an attachable nozzle, the nozzle having sufficient resiliency for comfort by the user and having a fluid passageway therein and compatible attaching means to the closure assembly, said closure assembly including:

(a) a retainer ring of a generally tubular configuration and having an aperture therethrough and a lower end of said ring having an outwardly directed annular groove portion formed thereon and at the other end of said retainer ring there is formed an inwardly disposed annular arcuate retaining recess;

(b) a nozzle retainer member having an inner aperture formed to provide detachable mounting and retaining means for a syringe nozzle, said nozzle retainer having an outwardly generally circular and planar projecting lip sized and adapted to snap into and thereby seat in a fluid tight manner with the inwardly disposed arcuate retaining recess in the retainer ring;

(c) a hinge connection having one end attached to an edge portion of the retainer ring and the other end attached to an outer extreme portion of the nozzle retainer, said hinge being of molding material that is slightly resilient and being integral with the retainer ring and nozzle retainer member so that substantially simultaneous molding may be performed, said hinge canted upwardly so as to avoid obstruction to inserting and seating the projecting lip of the nozzle retainer in the inwardly disposed arcuate retaining recess in the retainer ring when said projecting lip and said retaining recess are attachably mounted;



(d) a flexible bag of material generally impervious to fluid contained therein and having a resilient neck portion which includes a bead or band which is mountable in the outwardly directed annular groove portion of the retainer ring; and

(e) an outer safety retainer ring of a generally tubular configuration and having at least one retaining means formed thereon and disposed to engage and to be secured onto the retainer ring by engagement with the outer surface of said retainer ring thereby to retain the mounted bead or band of said flexible bag in said groove of the retainer ring, whereby when the nozzle retainer member is displaced from the arcuate retaining recess in the retainer ring, the secured flexible bag may be manipulated pass through the aperture in the retainer ring and into an inside-out condition whereby the inside surfaces of the bag may be washed and/or dried and then again manipulated through said aperture to be arrayed in a conventional position whereby it may be filled with fluid and the nozzle retainer membe snapped into place to provide mounted retention in the arcuate recess in the retainer ring.

4,487,337
AUTOMATIC BEVERAGE VENDING MACHINE

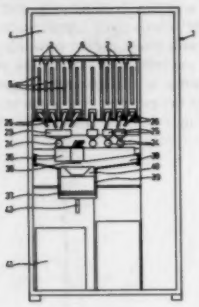
Andre P. DeJardins, Orsay, France, assignor to Societe Industrielle D'Appareils Automatiques, Chartres, France

Filed Oct. 14, 1981, Ser. No. 311,201
Claims priority, application France, Oct. 14, 1980, 80 21979
Int. Cl.³ B67D *5/56*
U.S. Cl. 222—129.3 16 Claims

1. An automatic mixed beverage vending machine compris-

ing a plurality of means for mixing dry powder products with liquid ingredients to form a mixture, means for delivering the mixture into cups; a plurality of containers for receiving said dry powder products; each said container having a front vertical face, a horizontal bottom face and two lateral vertical faces, said lateral faces having at their upper portions bent edges folded toward the external side of said container, one of said bent edges having a cut-out portion near its rear end defining a locking edge;

a horizontal support means having a plurality of slideway means for engaging said bent edges to suspend said respective containers for sliding movement,



a plurality of locking means which are pivotally mounted on said support means, at least one of said locking means lying in front of two adjacent containers to prevent forward movement of said adjacent containers, said locking means being pivotally movable to a position where it lies in front of only one of said adjacent containers so that the other adjacent container may slide forwardly on its slideway means, said locking means being slidable along the bent edge of the forwardly sliding other adjacent container until the locking means engages with said locking edge at the end of said sliding movement.

4,487,338

DISTRIBUTION FEEDER

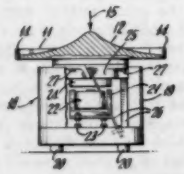
Yasushi Oshima, and Michinobu Onae, both of Akashi, Japan, assignors to Yamato Scale Company, Ltd., Akashi, Japan

Continuation-in-part of Ser. No. 192,417, Sep. 29, 1980, abandoned. This application Sep. 30, 1982, Ser. No. 431,801

Claims priority, application Japan, Dec. 5, 1979, 54-169112

Int. Cl.³ B67D *5/06*

U.S. Cl. 222—196 **2 Claims**



1. A distribution feeder for the distribution of articles substantially uniformly among a plurality of outlets and substantially preventing unduly sustained accumulation of articles at certain outlets comprising a substantially circular body having a vertically disposed central axis, a vertically disposed peripheral wall carried by said circular body and extending upwardly therefrom, said wall having a plurality of spaced outlets, means for individually operating each of said outlets, said outlets being selectively opened for the discharge of articles therefrom, the upper surface of said body being shaped such that the central portion is higher than the peripheral portion with the rate of slope decreasing with an increase in radius and means for vibrating said circular body vertically and rotationally about its center whereby the articles fed on to the central portion of said body will move downwardly in a spiral path at a speed inversely proportional to the radial position thereof and then continue to move circumferentially to effect substantially uniform distribution about the periphery of said feeder.

4,487,339

METHOD OF AND APPARATUS FOR STORING AND DISPENSING A MIXTURE OF PARTICULATE MATERIALS

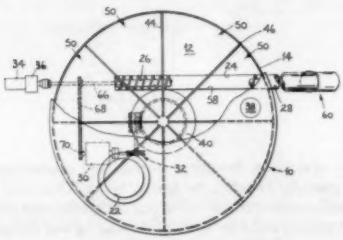
Henry Ellwood, Rochdale, England, assignor to USM Corporation, Farmington, Conn.

Filed Jul. 6, 1982, Ser. No. 395,124

Claims priority, application United Kingdom, Jul. 23, 1981, 8122795

Int. Cl.³ G01F *11/20*

U.S. Cl. 222—236 **1 Claim**



1. A storage and dispensing apparatus for a mixture of particulate materials comprising, a cylindrical storage vessel having a flat circular bottom and a cylindrical wall extending coaxially therefrom, a rotor mounted for coaxial rotation in the vessel and having a plurality of blades extending radially to the wall and from the bottom for a substantial part of the depth of the vessel dividing the vessel into a plurality of equal rotatable compartments, an inlet at the other end of the vessel for admitting the mixture to the vessel, means for rotating the rotor at a speed coordinated with the rate of admission of the mixture to cause progressive deposition of the mixture in layers in each compartment rotating past the inlet, an outlet slot extending across the bottom so as to communicate simultaneously with several of the rotating compartments, and progressively with all of the compartments during rotation of the rotor, a conveyor screw rotatable in an outlet channel secured to the bottom and underlying and communicating with the slot along its lengths for conducting the mixture falling through the slot simultaneously from several of the rotating compartments and progressively from all of the compartments, and separate means for rotating the screw and drivably connected to the rotor through a free wheeling mechanism so the rotor is driven at one speed during deposition of the mixture and driven at a reduced speed coordinated with the speed of rotation of the screw during conveying of the mixture.

4,487,340

ADJUSTABLE METERING OIL PUMP

Frank E. Shaffer, 33 Beach Dr., Newport Beach, Calif. 92663

Filed Jul. 16, 1982, Ser. No. 399,196

Int. Cl.³ B67D *5/40;* **F04B** *17/04, 39/10*

U.S. Cl. 222—385 **2 Claims**

1. Cutting fluid metering apparatus comprising;

a cutting fluid storage tank;

a cutting fluid pump housing formed by a tube having an

inlet and outlet located at its bottom and top extremities, respectively;

mounting means for mounting said tube on said tank projecting vertically downwardly to submerge said bottom extremity in fluid contained in said tank;

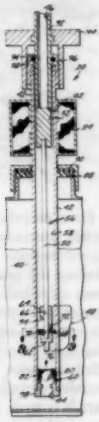
a piston rod received in said tube;

drive means coupled with the top end of said piston rod for reciprocating said rod up and down relative to said tube;

a support fitting mounted on the bottom end of said piston rod and formed with upwardly facing horizontally extending support surface;

a tilt fitting on said rod above said support surface and formed with a downwardly facing drive surface inclined with respect to the horizontal;

a piston washer telescoped over said piston rod and interposed between said support surface and drive surface said washer being configured and sized to assume a pumping position flat over said support surface with the outer periphery thereof closely fitting the interior of said tube



and to be engaged by said drive surface during the down stroke of said piston rod to be tilted to an orientation coextensive with said drive surface to provide for fluid flow between the opposite sides of said piston washer and the wall of said tube;

a check valve mounted on the bottom end of said tube for admitting flow in through said inlet and checking flow out said inlet whereby said drive means may be actuated to reciprocate said piston rod in said tube to alternately draw said support surface upwardly to engage the bottom side of said piston washer and raise said washer to lift fluid upwardly in said tube, while creating a negative pressure under said washer to draw fluid past said check valve and to then release said rod to be drawn downwardly under the influence of gravity to engage said inclined drive surface with the top surface of said washer to thereby tilt said washer to provide for relatively free flow past the opposite sides thereof and consequent relatively rapid dropping of said rod in said tube.

4,487,341

DISPENSER FOR DISPENSING CREAMS AND ESPECIALLY SELF-FOAMING GELS

Kenneth Daykin, Stockport, and Alan Straw, Macclesfield, both of England, assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Oct. 1, 1981, Ser. No. 307,546
Int. Cl.³ G01F *11/00*
U.S. Cl. 222—391 **15 Claims**

1. A dispenser comprising a container having a neck, a spout connected to said neck, a dip tube slidably mounted in said neck and including a slot movable into alignment with said spout when said dip tube is depressed, the outer surface of said dip tube and the inner surface of said container being serrated to form teeth, a piston slidably mounted on said dip tube, said piston including a flexible disc having initially downturned

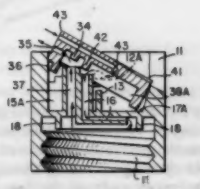
concentric peripheral edges permitting initial movement of said piston upwardly during a filling operation, the inner and outer peripheral edges of the flexible disk engage the serrated teeth on the dip tube and inner surface of the wall, respectively, said concentric peripheral edges being turned upwardly upon initial downward movement of said dip tube.

4,487,342

PUSHBUTTON TYPE BOTTLE CAP

Min C. Shy, 20, Alley 18, La. 109, Hoping St., Yang Ho City, Taipei Hsien, Taiwan

Filed May 11, 1982, Ser. No. 377,097
Int. Cl.³ B67D *3/00*
U.S. Cl. 222—481.5 **3 Claims**



1. A bottle cap of the pushbutton type for attachment to the mouth of a bottle comprising

a jacket having means for attachment to the mouth of a bottle,

a round pushboard pivotally mounted to and interfitted in said jacket for operation by applying pressure to a rear portion of said pushboard to pivot it from a level closed position to a sloping open position relative to said jacket,

a checkboard in said jacket mounted below said pivotally mounted pushboard,

a chamber enclosed by said pushboard and said checkboard, said checkboard including

an effluent pipe having upper and lower ports,

an air intake pipe having upper and lower ports,

said lower ports of said effluent pipe and said air intake pipe having means to space them from each other to prevent the entrance of fluid contents of the bottle into said air intake pipe,

said pushboard including

a pair of protruding plugs on the bottom of said pushboard in positions to block the upper ports of said effluent pipe and said air intake pipe when said pushboard is in a level closed position,

an effluent duct and an air intake passage in said pushbutton each having ports opening forward at one end of each said duct and said passage, and having ports at their opposite ends fluidly connected respectively with said upper ports of said effluent pipe and said air intake pipe,

said port on the opposite end of said air intake passage opening into said chamber,

said effluent duct and said air intake passage having their forward openings exposed when said pushboard is in a sloping open position and covered when said pushboard in in a level closed position,

said air intake passage fluidly connected to said air intake pipe through said chamber when said pushboard is in a sloping open position, and said air intake passage open only to said chamber when said pushboard is in a level closed position,

whereby a pushbutton type bottle cap delivers a smooth outflow of fluid in its open position and is doubly secured against spillage or evaporation in its closed position.

4,487,343

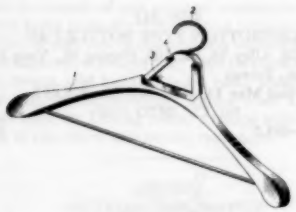
GARMENT HANGER

Thomas Chen, Fl. 5, 24, Lane 33, Tei-Shiang Rd., Taipei, Taiwan

Filed Dec. 2, 1982, Ser. No. 446,207

Int. Cl.³ A47J *51/082, 51/095*

U.S. Cl. 223—85 **8 Claims**



1. A garment hanger comprising:

a hanger body having upwardly converging arms on which a garment may be supported joined at an upper part;

a U-shaped handle groove in one side of said upper part;

a tubular pivot opening extending through said upper part between the upper ends of the legs of said U-shaped groove;

a hook shaped groove in the other side of said upper part, the uppermost part of which extends through the top of said upper part and communicates with said pivot opening;

a pivot element rotatably mounted within said pivot opening;

a hook element conforming to the shape of said hook-shaped groove for interfitting engagement therein extending from said pivot element through said hook-shaped groove; and

a U-shaped handle element conforming to said U-shaped groove for interfitting engagement therein having its legs extending from the ends of said pivot element in a direction substantially opposite to the plane of said hook element;

so that said hook and handle elements are rotatable about said pivot from a position wherein said hook element extends upwardly from said hanger body when said handle element is in said U-shaped groove to a position wherein said handle element extends upwardly from said hanger body when said hook element is in said hook-shaped groove.

4,487,344

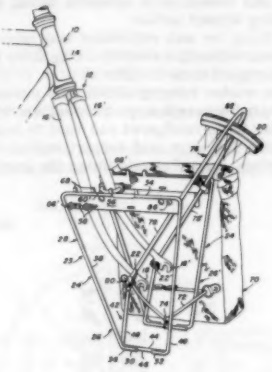
PANNIER CARRIER FOR BICYCLES

James R. Blackburn, 303 Casitas Bulevar, Los Gatos, Calif. 95030, and James J. Gentes, 1010 Gale Dr., Campbell, Calif. 95008

Filed Jul. 29, 1981, Ser. No. 288,104

Int. Cl.³ B62J *9/00*

U.S. Cl. 224—39 **12 Claims**



1. A pannier carrier for a bicycle including a turning fork having a pair of branches journalling a bicycle wheel, the carrier comprising, in combination:

(a) frame means including left and right carrying bag supporting side members disposed on respective ones of the branches of an associated turning fork for being substantially centered with respect to an associated wheel journalled on the turning fork, the side members of the frame means each including an open framework normally arranged in a substantially vertical plane and comprising a top part, a front part, a bottom part, and a rear part;

(b) attachment means provided on the frame means for connecting the side members to an associated turning fork, said attachment means including a connecting bracket having a pair of legs joined together so as to intersect at an acute angle, one of the legs partially forming the bottom part of one of the frameworks, and the other of the legs extending upwardly toward the top part of the framework and terminating internally of the framework, with connector means terminating the other of the legs for attaching the framework on an associated branch of a turning fork of a bicycle on which the frame means is to be mounted; and

(c) spreader means connected to the frame means for spreading and rigidifying the side members.

4,487,345

BACKPACK CHAIR

Mel P. Pierce, 34511 Via Espinoza, Capistrano Beach, Calif. 92624, and Kenneth O. Merrill, 329 Calle Dorado, San Clemente, Calif. 92672

Filed Dec. 27, 1982, Ser. No. 453,338

Int. Cl.³ A45F *4/02*

U.S. Cl. 224—155 **5 Claims**

1. A backpack unit comprising:

a pack container having a forward wall panel;

a pair of shoulder straps;

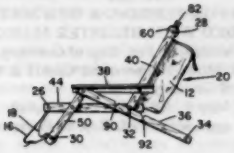
a back rest panel adapted to rest against the back of a wearer of said shoulder straps;

a frame in the form of a folding chair frame including a back panel frame and a seat panel frame and a pair of front legs pivotally mounted on the seat panel frame and capable of being folded such that the back panel frame and the seat

panel frame and the front legs fold substantially parallel and adjacent to one another;

said forward wall panel of the pack container being attached to said back panel frame;

said back rest panel extending between connections to said forward legs and said seat panel frame; and



further comprising a cross member interconnecting said legs in the region of their lower ends and said connections of the back rest panel to said forward legs being made to said cross member.

4,487,346

INFANT SLING-TYPE CARRIER

Benhardt B. Fischer, Jr., 2085 Albion St., Denver, Colo. 80207

Filed Jun. 6, 1983, Ser. No. 501,424

Int. Cl.³ A45F *3/04, 3/12*; A47D *13/02*

U.S. Cl. 224—160 **13 Claims**

1. An infant carrier comprising an endless strap extending diagonally from one shoulder of the wearer downwardly across the front and back of the wearer's torso and terminating in a lower looped end surrounding the opposite side at or near the waist region of the wearer, and straddle means extending lengthwise along said lower looped end of said strap upon which an infant child is straddled in a forwardly facing position, comprising a padding portion disposed in at least upwardly facing relation away from said lower looped end of said strap, said padding portion having a central portion which is relatively widened with respect to said lower looped end and opposite ends attached in fixed relation to said lower looped end.

4,487,347

GOLF BAG AND CARRYING DEVICE

Michael A. Zegar, 1 Brookview Rd., Whitehouse Station, N.J. 08889

Filed Sep. 12, 1983, Ser. No. 531,405

Int. Cl.³ A45C *13/30*

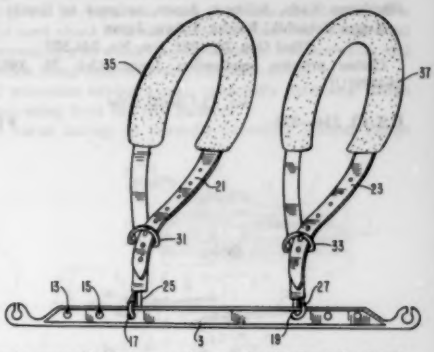
U.S. Cl. 224—259 **15 Claims**

1. A golf bag and carrying device, comprising:

(a) a single strap golf bag of conventional design and having at least two attachment means thereon;

(b) an elongated rigid bar having two ends, each end of which is capable of being attached to one of said two attachment means, said elongated rigid bar having a plurality of perforations contained therein; and,

(c) two shoulder straps capable of attachment to said bar at said perforations so as to permit the carrying of said golf



bag in controlled balance with weight distributed to both shoulders of the carrier.

4,487,348

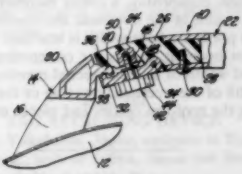
ADJUSTABLE AND REMOVABLE CROSS RAIL

Ray G. Mareydt, Warren, Mich., assignor to Four Star Corporation, Troy, Mich.

Continuation of Ser. No. 311,688, Oct. 15, 1981, abandoned. This application Aug. 15, 1983, Ser. No. 523,025

Int. Cl.³ B60R *9/04*

U.S. Cl. 224—321 **10 Claims**



1. An article carrier of the type adapted to be mounted on an exterior vehicle surface that extends generally horizontally, said carrier including a pair of side rails supported above the generally horizontal vehicle surface, each side rail having an outer surface, a cross rail extending between said side rails, and a pair of bracket devices for supporting the ends of the cross rail for longitudinal adjustment along said side rails, the improvement wherein each bracket device includes;

a first member non-movably fixed to said cross rail and adapted to overlay a portion of the associated side rail outer surface to support all vertical loads imposed on the cross rail;

a second member movable with respect to the first member and adapted to underlay a portion of the associated side rail outer surface in an opposed relationship to the first member; and

means for adjustably connecting said first and second members to adjustably clamp said members to said side rail, and said connecting means permitting said second member to move out of its underlaying position relative to said side rail whereby the cross rail can be removed from the side rail; and

wherein each side rail is provided with a lip portion projecting outwardly from the outer surface thereof substantially throughout the length thereof, and the first and second members of the bracket device associated with each side rail clampingly engaging the lip thereof to secure the cross rail to the side rail.

4,487,349

ROOF-TOP CARRIER MOUNTING APPARATUS FOR VEHICLE

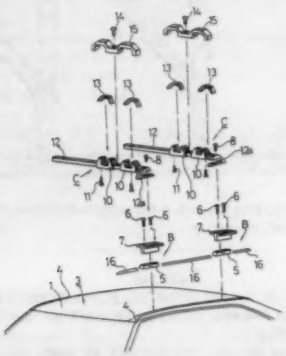
Hirokatsu Kudo, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 28, 1983, Ser. No. 546,505

Claims priority, application Japan, Oct. 28, 1982, 57-164499[U]

Int. Cl.³ B60R 9/04

U.S. Cl. 224—322 **9 Claims**



1. A mounting apparatus for a roof-top carrier with end pieces to mount to a vehicle roof which has slots formed longitudinal into said roof, said slots having an overhead opening of specified width, comprising, a cotter member having a width less than the width of the overhead slot opening, a base member having a portion whose width is less than the width of the overhead slot opening, means for connecting said members, the combined width of said connected members being greater than the width of the overhead opening of the slot, and means for attaching the roof-top carrier end pieces to said connected members.

4,487,350

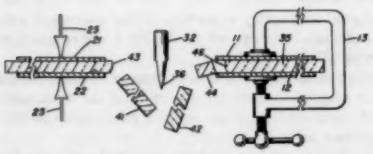
METHOD AND APPARATUS FOR CUTTING PATTERN SHAPED HOLES IN GLASS SHEETS

Robert P. DeTorre, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 7, 1983, Ser. No. 483,077

Int. Cl.³ C03B 33/04

U.S. Cl. 225—2 **20 Claims**



1. A method for producing pattern shaped holes in a glass sheet having a first and a second major flat surface, the method comprising the steps of:

making a first closed score in the first major flat surface of the glass sheet, said first score defining the pattern shaped hole,

making a second closed score in the first major flat surface of the glass sheet said second score inside of said first score and spaced therefrom;

applying a clamping pressure on both said first and said second surfaces of the glass sheet between said first and said second scores but not extending within the area bounded by said second closed score; and

fracturing the glass within said second score on the second surface of said glass sheet to break away the portion of the glass sheet defined by said first closed score.

4,487,351

APPARATUS FOR FEEDING A WEB MATERIAL PROVIDED WITH REGISTER MARKS

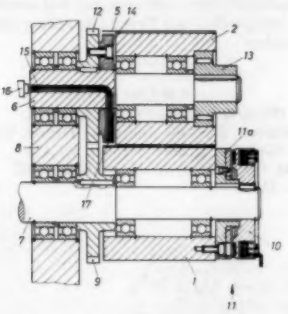
Siegfried Knecht, Gevelsberg, Fed. Rep. of Germany, assignor to Maschinenfabrik Alfred Schmermund GmbH & Co., Gevelsberg, Fed. Rep. of Germany

Filed May 9, 1983, Ser. No. 492,610

Claims priority, application Fed. Rep. of Germany, May 25, 1982, 3219622

Int. Cl.³ B65H 23/18

U.S. Cl. 226—37 **20 Claims**



1. Apparatus for feeding a web of material provided with register marks comprising:

feed means, said feed means comprising a pair of cooperating and counter-rotating rollers;

light responsive sensor means, said sensor means being at least in part mounted for rotation with one of said rollers, said sensor means being positioned so as to present a test point juxtapositioned to a web of material passing over the said one roller, said sensor means providing output signals commensurate with registration and non-registration of said test point with a register mark; and

means responsive to signals provided by said sensor means for producing an adjustment in the relative angular position of said rollers to vary the speed of the web whereby the position of a register mark on the web of material may be caused to move relative to said test point.

4,487,352

APPARATUS FOR ADJUSTING THE FEED LENGTH OF STRIP MATERIAL TO A PRESS

Edward S. Paris, Allison Park, Pa., assignor to Vamco Machine and Tool, Inc., Pittsburgh, Pa.

Filed Nov. 13, 1981, Ser. No. 321,219

Int. Cl.³ B65H 17/22

U.S. Cl. 226—142 **11 Claims**

1. Feeding apparatus for intermittently feeding strip material in preselected lengths comprising,

an input shaft supported for rotation at a continuous preselected speed,

an output shaft having a first end portion and a second end portion, said output shaft having an axis of rotation,

drive means drivingly connecting said output shaft first end portion to said input shaft for generating oscillating rotational movement of said output shaft through a preselected angle of rotation,

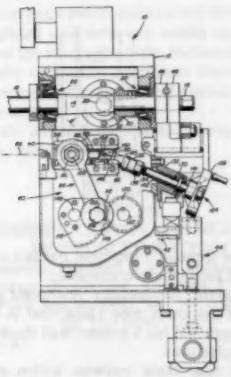
feed means for intermittently feeding preselected lengths of the strip material in a selected direction,

rotation transmission means drivingly connected at one end to said output shaft second end portion and at another end to said feed means,

said rotation transmission means being movable in response to the oscillating movement of said output shaft to transmit oscillating rotational movement to said feed means to intermittently advance preselected lengths of strip material,

support means connected to said output shaft second end portion for adjustably supporting said rotation transmission means one end for movement relative to said output shaft second end portion, said support means overlying said output shaft axis of rotation,

adjusting means including an adjusting screw rotatably mounted on said support means and connected to said rotation transmission means for selectively moving said one end of said rotation transmission means on said support means relative to said output shaft second end portion upon rotation of said adjusting screw, said adjusting screw having a rotational axis transversely aligned with and intersecting said output shaft axis of rotation,



said adjusting screw being operable upon rotation to move said rotation transmission means one end along said adjusting screw rotational axis to a preselected position relative to said output shaft axis of rotation on said support means to adjust the feed length of the strip material as the strip material is being fed,

actuating means for rotating said adjusting screw to move said one end of said rotation transmission means to a preselected position on said support means corresponding to a preselected feed length of the strip material, and

said actuating means being connected to said adjusting screw at a point positioned on said adjusting screw rotational axis and overlying said output shaft axis of rotation for movement independently of rotation of said output shaft so as not to rotate with said output shaft as the strip material is being fed.

4,487,353

POWDER ACTUATED TOOL

John Benson, Sherwood; Harold L. Hanel, and Douglas A. Freeman, both of Portland, all of Oreg., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Nov. 18, 1981, Ser. No. 322,569

Int. Cl.³ B25C *1/14*

U.S. Cl. 227—9 **6 Claims**

5. A tool for explosively driving an elongated fastener into a work surface comprising:

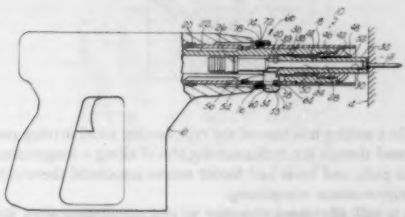
a housing having a barrel therein containing a slidable extension at its forward end, said extension having an axial bore therein;

a captive piston in said barrel;

said piston having a rear head slidable in said barrel and a forward shank of a diameter less than that of said head providing a forwardly facing shoulder therebetween, said shank being slidable in said extension bore;

said extension having a rear, outwardly extending flange providing front and rear surfaces;

said barrel having an inwardly extending annular flange



adjacent to said forward end surrounding said extension and providing a rearwardly facing shoulder, said shoulder being spaced forwardly of said front surface defining an annular channel therebetween;

an extrudible stop member in said channel and adapted to be deformed if overdrive of the piston occurs; and,

a passage between said channel and the front of said flange through which said stop member will extrude if repeated overdrive of the piston occurs thereby providing at the front of said barrel a visual indication of overdriving having occurred.

4,487,354

TAG ATTACHING DEVICE

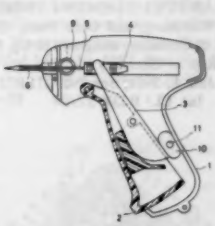
Hideyuki Ueno, Yokohama, Japan, assignor to Toska Co., Ltd.; Bano'k Co., Ltd., both of Tokyo, Japan and Ben Clements & Sons, Inc., South Hackensack, N.J.

Filed Oct. 30, 1981, Ser. No. 316,713

Claims priority, application Japan, Nov. 11, 1980, 55-157663

Int. Cl.³ B25C *1/00*

U.S. Cl. 227—67 **10 Claims**



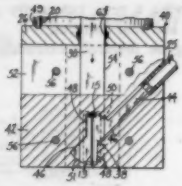
1. In a tag attaching device of the type in which a push rod moving in the axial direction of a hollow needle equipped with a transverse groove is disposed at the back of said hollow needle disposed at the front portion of a main body and is moved by a lever mechanism so as to push a transverse bar of a tag pin into said hollow needle, the improvement comprising a buffer means, a member which drives said push rod comes into contact with said buffer means during the operation of said tag attaching device and reduces the moving speed of said push rod during the period in which said transverse bar moves inside said hollow needle.

4,487,355

NAILING MACHINE

Oscar H. Ginnow, and Roger H. Ginnow, both of Hopbrook Rd., Bethany, Conn. 06525

Filed May 7, 1982, Ser. No. 376,014
Int. Cl.³ B25C 1/04
U.S. Cl. 227—112 **8 Claims**



1. In a nailing machine of the type having a nail driving ram mounted therein for reciprocating travel along a longitudinal stroke path, and loose nail feeder means associated therewith, the improvement comprising:

(a) a nail alignment chamber in communication with and positioned in a plane adjacent to, but displaced from, the stroke path of the driving ram, the alignment chamber being adapted to receive nails from the nail feeder means at an angle to the stroke path of the driving ram and being dimensioned and configured so as to permit rotation of a received nail from the inclined delivery position to a position substantially parallel to the stroke path of the driving ram;

(b) nail transfer means for transferring individual nails from the loose nail feeder means to the alignment chamber, the nail transfer means having a feed path disposed at an inclined angle relative to the stroke path of the driving ram; and

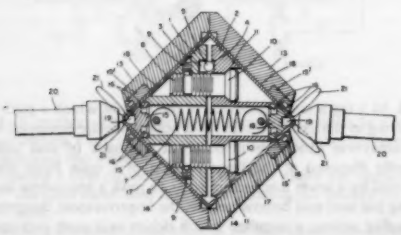
(c) a magnet located adjacent to the stroke path of the driving ram and being so positioned as to magnetically rotate a nail in the alignment chamber from the inclined delivery position to a position substantially parallel to the stroke path of the driving ram and to magnetically move the nail from the alignment chamber into a driving position aligned within the stroke path of the driving ram.

4,487,356

DEVICE HAVING EXPANDABLE MANDREL FOR MAKING NUCLEAR FUEL ELEMENT STORAGE TUBES

Friedrich Krieger, Würzburg, and Otto Weis, Oberpleichfeld, both of Fed. Rep. of Germany, assignors to Gg. Noell GmbH., Würzburg, Fed. Rep. of Germany

Filed Jun. 8, 1981, Ser. No. 271,071
Int. Cl.³ B23K 37/04
U.S. Cl. 228—46 **6 Claims**



1. A device for manufacturing hollow containers of sheet metal for the fuel elements of nuclear power plants including a core, and a thrust bearing and a counterpressure bearing surrounding said core, said device comprising

(a) a pair of separate core portions;

(b) spring means tending to draw said pair of core portions toward each other;

(c) fluid operated cylinder-piston units tending to separate said pair of core portions against the action of said spring means;

(d) adjustment screw means in one of said pair of core portions having first abutment means; and

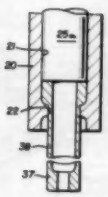
(e) second abutment means in the other of said pair of core portions cooperating with said first abutment means.

4,487,357

METHOD FOR FORMING WELL DRILL TUBING

Joseph A. Simon, 237 Lothrop, Grosse Pointe Farms, Mich. 48236

Filed May 24, 1982, Ser. No. 381,334
Int. Cl.³ B21C 25/04, 25/08, 23/08, 33/00
U.S. Cl. 228—173 F **2 Claims**



1. A method for forming a seamless, flanged end, drill pipe tube from seamed tube blanks comprising:

providing a straight, substantially uniformed diameter and uniform wall thickness tube blank that is considerably shorter in length and has a greater wall thickness than the desired drill pipe tube;

positioning the tube blank endwise within an elongated, cylindrically shaped die opening having a small diameter restricted die throat portion at its lead end for receiving the lead end of the tube blank, and wherein the tube blank is formed of a seamed tube material and said seam being eliminated during the extrusion of the tube blank through the die throat to form seamless drill tubing;

inserting an elongated pusher rod into the tube blank opposite end, with the pusher rod having a substantially uniform diameter of approximately the desired internal diameter of the drill tube, except for its lead end portion being of a smaller diameter and being located at the lead end of the tube blank, and having a trailing end located outwardly of the trailing end of the tube blank and formed with a shoulder portion for applying a longitudinally directed pushing force upon the trailing end of the tube blank to force it in an axial direction;

advancing the pusher rod longitudinally so that its shoulder portion extrudes the tube blank through the die throat;

positioning the pusher rod lead end portion within the die throat during the time that the pusher rod advances and causes the tube blank lead end portion to pass through the die throat for flowing the material comprising the lead end portion of the tube length radially inwardly into an inwardly thickened annulus;

positioning the remainder of the pusher rod within the die throat portion during further advancement of the pusher rod for flowing the body of the tube length around the pusher rod to form the internal wall of the drill tube while the die throat forms the external wall of the drill tube;

stopping the advance of the pusher rod just before the trailing end portion of the tube length is pushed through the die throat;

removing the pusher rod from the tube length and from the

die and inserting a second tube blank with its lead end abutting the trailing end of the first tube blank;

reinserting the pusher rod into the tube blank and advancing the pusher rod to exert a longitudinally directed force upon the second tube blank so that it pushes the first tube blank through the die throat;

positioning the pusher rod lead end portion within the die throat while the trailing end of the first tube blank and the lead end of the second tube blank passed through the die throat for forming an inwardly thickened annulus on each blank during the endwise advancement of the pusher rod;

after the first tube blank is extruded through the die throat, continuing the cycle of pushing the second tube blank and thereafter removing the pusher rod and adding the next tube blank to successively form drill tubes;

wherein elongated drill tubes are formed, each having a wall thickness corresponding to the space between the die throat defining wall and the outer wall surface of the pusher rod and each having inwardly thickened flange-like ends; and

including inserting a punch endwise into the opposite ends of the completed drill tube and axially moving the punch endwise of the tube to force the thickened annulus at each end radially outwardly a sufficient distance to form outwardly extending flange-like end portins due to the material flow; and

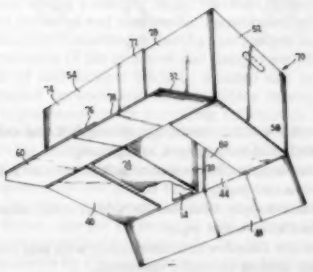
welding male and female coupling parts to the opposite flange-like end portions.

4,487,358

PARTITIONED CARTON AND BLANK WITH REINFORCED BOTTOM

Everett J. Ambrose, Hartford, Conn., assignor to Continental Plastic Beverage Bottles, Inc., Stamford, Conn.

Filed Sep. 20, 1982, Ser. No. 420,057
Int. Cl.³ B65D *5/48*
U.S. Cl. 229—27 **3 Claims**



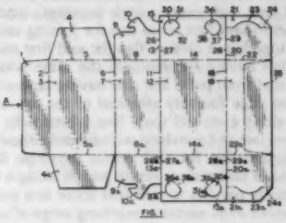
1. A carton blank comprising a sheet of corrugated board cut and die stamped to form in sequence a securing flap, a partition wall, a partial side wall, an end wall, a side wall, another end wall and a terminal partial side wall, each of said walls having a bottom closing flap foldably connected to a like edge thereof; said blank being improved by said securing flap being of a length and said partial side wall and said terminal partial side wall being of a combined length to define an overlap thus to provide a columnar strength to a resultant carton on opposite sides of said partition wall with a combined minimum use of corrugated board and minimum board weight, said side wall having a length on the order of twice the length of said end walls, and said bottom closing flaps carried by said partial side wall being positioned to have in the resultant carton an overlap aligned with a bottom space void of one of saiid bottom closing flaps carried by said end walls and said partition wall.

4,487,359

AID FOR OPENING AND REOPENING OF FROZEN DESSERT BOXES

George T. Hemmeter, 4125 Black Point Rd., Honolulu, Hi. 96816

Continuation-in-part of Ser. No. 488,197, Apr. 25, 1983,. This application May 23, 1983, Ser. No. 497,111
Int. Cl.³ B65D *5/10, 3/26*
U.S. Cl. 229—39 R **4 Claims**



1. A rectangular carton for containing a frozen dessert, said carton comprising opposing front and back walls, two opposing side walls, and opposing top and bottom closure walls, each closure wall including an innermost closure flap entirely in contact with the frozen dessert to be contained in the carton, and at least one additional flap covering each said innermost flap, said innermost flap having at least one depressible tab to define a finger hole for breaking the bond created between the frozen dessert and said innermost flap so that said innermost flap may be lifted, said tab covering said holes prior to being depressed.

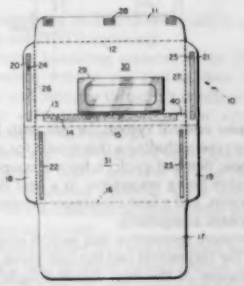
3. A rectangular carton for containing a frozen dessert, said carton comprising opposing front and back walls, two opposing side walls, and opposing top and bottom closure walls, each closure wall including an innermost closure flap entirely in contact with the frozen dessert to be contained in the carton, and at least one additional outer flap covering each of said innermost flaps, said innermost flaps having at least one depressible cut tab to define a finger hole for breaking the bond created between the frozen dessert and said innermost flaps so that said innermost flaps may be lifted, said tabs covering said defined finger holes prior to being depressed.

4,487,360

TWO WAY ENVELOPE

Harland S. Fisher, Longmeadow; Wilfred H. Gendron, Wilbraham, and Gregory Georgiades, Longmeadow, all of Mass., assignors to Westvaco Corporation, New York, N.Y.

Filed Mar. 30, 1982, Ser. No. 363,547
Int. Cl.³ B65D *27/06*
U.S. Cl. 229—73 **6 Claims**



1. A combination mailing and return envelope having sepa-

rate fully enclosed pockets for both first and return mailing, and formed from a single blank of paper or the like having inner and outer surfaces comprising a front panel for the first mailing envelope of generally rectangular shape having side, top, and bottom edges, a panel which serves as the rear panel for first mailing and return having substantially the same height and width as said front panel with side, top, and bottom edges, a return panel which serves as the front panel for return mailing having substantially the same width but less height than said front and rear panels with side, top, and bottom edges, a first score line extending transversely of said blank for joining said rear and return panels together, means substantially parallel to said first score line for joining said front and rear panels together, a closure flap for said first mailing envelope, said flap having substantially the same width but less height than said front panel and also having tapered side edges and a bottom edge foldably attached to the top edge of said front panel along a second score line substantially parallel to said first score line and provided with spaced adhesive patches, a second closure flap for said return envelope foldably attached to one of said rear or return panels along a third score line substantially parallel to said first score line and provided with an adhesive strip, means comprising strips of adhesive for adhering the side edges of said rear panel to the side edges of said return panel to form a permanent, fully enclosed pocket for said return envelope, detachable side extensions connected to the side edges of at least the front and rear panels along spaced apart, parallel perforated lines which extend generally longitudinally of said blank at each side of the blank wherein the side extensions connected to the front and rear panels are adhered together to form a fully enclosed pocket for said first mailing envelope, an insert included in the pocket for the first mailing and a third perforated line extending generally transversely of said blank for dividing the blank into its mailing and return portions, said construction defining a combination mailing and return envelope with detachable side extensions on at least two of its panels and having fully enclosed pockets for both first and return mailing wherein the rear panel is the same for both the first mailing and return envelopes.

4,487,361

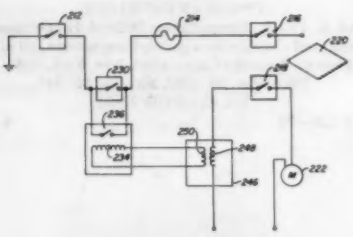
HEAT EXCHANGER FLAME CONTROL

Claude D. Brown, Arvada, Colo., assignor to BBC Industries, Inc., Grass Valley, Calif.

Continuation-in-part of Ser. No. 237,822, Feb. 25, 1981, abandoned. This application Sep. 30, 1982, Ser. No. 432,074

Int. Cl.³ F24D *5/00*

U.S. Cl. 236—11 **5 Claims**



1. A flame control system for use with heat exchange systems of the type including a thermostat for initiating and terminating a heat demand cycle, a burner coupled to a fuel valve, the fuel valve being responsive to a heat demand signal from the thermostat, and a heat exchanger proximate the burner, the control system comprising:

a temperature responsive first switch means, placed in series with the thermostat and the fuel valve, for preventing the application of the heat demand signal to the fuel valve when the temperature of the heat exchanger rises above a first temperature so the flow of fuel to the burner is halted upon the opening of said first switch means, and for permitting the reapplication of the heat demand signal to the fuel valve when the temperature of the heat exchanger drops below a second temperature so the fuel to the burner is restarted upon the closing of said first switch means;

a fluid circulator arranged and adapted to remove heat from the heat exchanger;

a normally open second switch, responsive to the temperature of the heat exchanger and operably coupled to said fluid circulator, adapted to close and activate said circulator when the temperature of the heat exchanger rises above a third temperature;

a normally closed third switch placed in parallel across said first switch means; and

means for opening said third switch when said second switch is closed so that the heat demand signal from the thermostat to the fuel valve cannot be disrupted until after said fluid circulator has been activated.

4,487,362

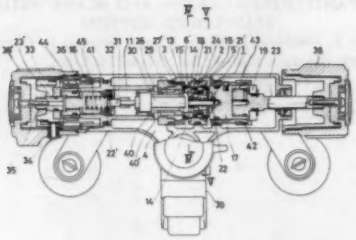
FIXTURE FOR THERMOSTATICALLY MIXING HOT AND COLD WATER

Yoshiaki Kitamura; Hitoshi Nomura, and Tuyoshi Harada, all of Gifu, Japan, assignors to Kitamura Gokin Industrial Co., Ltd., Gifu, Japan

Filed Apr. 13, 1983, Ser. No. 484,554

Int. Cl.³ G05D *23/13*

U.S. Cl. 236—12.2 **6 Claims**



1. A fixture for thermostatically mixing hot and cold water from hot- and cold-water pipes, comprising:

a hot water supply chamber to which hot water is fed from said hot-water pipe,

a cold-water supply chamber to which cold water is fed from said cold-water pipe,

a mixed-water chamber communicating with said two chambers and formed coaxially therewith,

a valve chest accommodated in said hot-water supply chamber and said cold-water supply chamber and communicating with these two chambers through a hot-water inlet and a cold-water inlet, respectively,

a main valve and a control valve slidably accommodated in said valve chest,

an elongate tubular body accommodated in said mixed-water chamber and connected with said valve chest, one end of said elongate tubular body, which end is disposed within said valve chest, being formed into a valve seat on which said control valve is adapted to rest,

a casing slidably fitting in said elongate tubular body,

a temperature sensing element accommodated in said casing, and

spring means for engaging at opposite ends against said main valve and said control valve so as to bias said control valve against said valve seat.

4,487,363

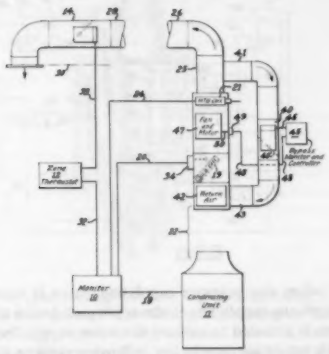
BYPASS CONTROL SYSTEM TO MAINTAIN A CONSTANT AIR SUPPLY PRESSURE IN A HVAC DUCT SYSTEM

Jeffrey L. Parker, and Edward Parker, both of Jacksonville, Fla., assignors to Parker Electronics, Inc., Jacksonville, Fla.

Continuation-in-part of Ser. No. 434,259, Oct. 14, 1983, and Ser. No. 454,483, Dec. 29, 1982,. This application Feb. 28, 1983, Ser. No. 470,331

Int. Cl.³ F24F 7/00

U.S. Cl. 236—49 **20 Claims**



1. In a system for providing conditioned air from a single zone HVAC unit to a plurality of zones through a duct system having a motorized zone damper associated with each zone which modulates open and closed in response to a zone thermostat in each zone, the HVAC unit including a fan and electrical motor for discharging conditioned air into the outlet of the HVAC unit and a bypass duct communicating between the outlet and the return air intake of the HVAC unit, the improvement comprising a motorized bypass damper located in said bypass duct having a damper blade movable between opened and closed positions and intermediate positions therebetween, a bypass monitor connected to said bypass damper for controlling the operation of the motor of said damper and thereby the movement of said damper blade to selected said positions, a sensor coupled between said electric motor driving said fan and said bypass monitor for providing information indicative of the amount of work being performed by said electrical motor driving said fan to said monitor, said electrical motor driving said fan performing less work when one or more of said zone dampers modulate closed thereby causing an increase in the static air pressure in the duct system, said monitor controlling said bypass damper to move its said damper blade more open to correspondingly compensate for the increase in the static air pressure by bypassing more air from said outlet to said inlet of said HVAC unit thereby maintaining the air pressure supplied by said HVAC unit to said duct system generally constant.

4,487,364

ARRANGEMENT FOR HEATING THE OPERATOR'S CABIN OF A MACHINE DRIVEN BY AN INTERNAL COMBUSTION ENGINE

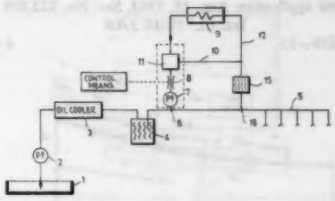
Conrad Okulicz, Dusseldorf, and Achim Z. Nieden, Cologne, both of Fed. Rep. of Germany, assignors to Klöckner-Humboldt-Deutz AG, Cologne, Fed. Rep. of Germany

Filed Dec. 27, 1982, Ser. No. 452,928

Int. Cl.³ B60H 1/02

U.S. Cl. 237—12.3 R **21 Claims**

1. An arrangement for heating the operator's cabin of a machine driven by an internal combustion engine, comprising a lubricating- and cooling-oil distribution system of the engine having oil distribution points, said system including a first hydraulic pump for pumping oil from the engine oil sump through pressurized lines of said system, a heating system connected in series with said distribution system and including a second hydraulic pump driven by the engine for withdrawing engine oil from said distribution system and pumping the engine oil through said heating system, an intake line leading into said second pump and being connected into said distribution system at a take-off point downstream of said first pump, a throttling element in said heating system downstream of said second pump for reducing the pressure and elevating the temperature of the engine oil passing therethrough, a space heat



exchanger in said heating system downstream of said throttling element for supplying heat to the operator's cabin, a by-pass line in said heating system by-passing said heat exchanger, an adjustable control element for selectively controlling the flow of heated oil downstream from said throttling element to said heat exchanger or through said by-pass line depending on the heating requirements of said heating system, a return line leading from said heat exchanger and connected into said distribution system at a junction point upstream of said oil distributing points and upstream of said take-off point, whereby the oil fed components of the engine are immediately heated through said oil distributing points.

4,487,365

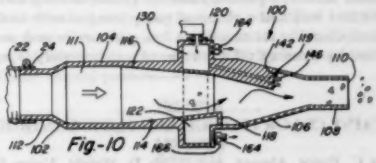
REDUCED FIBER INSULATION NOZZLE

Henry V. Sperber, 8 Red Fox La., Englewood, Colo. 80110

Filed May 19, 1981, Ser. No. 265,258

Int. Cl.³ B05B 7/04, 7/14; B05D 1/02

U.S. Cl. 239—8 **5 Claims**



1. A process for supplying insulating materials to a desired location at conventional rates comprising:

(a) suspending fibrous insulating material in an air stream moving ht a certain volume per unit of time and at a certain pressure and velocity through a confined space;

(b) increasing the velocity of said confined moving air stream while reducing said pressure;

(c) creating turbulence in said confined moving air stream;

(d) injecting a stream of liquid adhesive in a spray pattern into said fibrous insulating material while said fibrous insulating material is within said confined space and in said turbulent moving air stream;

(e) injecting air under pressure into said turbulent moving air stream containing said adhesive coated fibrous insulating material so that portions of said pressurized air are entrapped within said fibrous insulating material;

(f) said stream of liquid adhesive and said injected air sub-

stantially increasing the pressure of said confined moving air stream; and

(g) rapidly decreasing the pressure of said confined air stream causing the air in said air stream to expand and fluff said insulating materials.

4,487,366

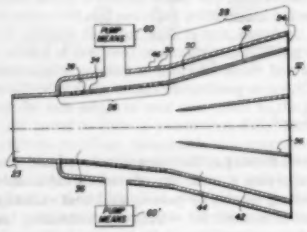
POROUS-WALL COMPACT LASER DIFFUSER

James A. Davis, Thousand Oaks, and Lamar F. Moon, Agoura, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation of Ser. No. 242,955, Mar. 12, 1981, abandoned. This application Aug. 15, 1983, Ser. No. 523,509

Int. Cl.³ H01S *3/08*

U.S. Cl. 239—11 **6 Claims**



1. A chemical laser diffuser for increasing the pressure and reducing the velocity of a supersonic gas flow, comprising:

a supersonic section wherein said supersonic gas flow tends to create a boundary layer circumscribing said supersonic gas flow;

a subsonic section juxtaposed and integrally connected to said supersonic section so that said gas flow progresses sequentially through said supersonic section and said subsonic section; and

means for reducing said boundary layer in the supersonic section to stabilize a strong normal shock at the downstream exit of said supersonic section, and wherein said means comprises a perforated wall defining said supersonic section, a plenum chamber circumscribing said perforated wall and a chemical pump integral with said plenum chamber for creating a low pressure in said plenum thereby drawing off a portion of said boundary layer.

4,487,367

PAINT COLOR CHANGE AND FLOW CONTROL SYSTEM

James C. Perry, Almont, and Dolph D. Wright, Union Lake, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 14, 1982, Ser. No. 434,279

Int. Cl.³ F23D *13/28*

U.S. Cl. 239—112 **11 Claims**

1. A paint color change system including pressure regulation for supplying paint to applicator means comprising:

individual fluid sources for paint and cleaning fluid, first and second supply lines,

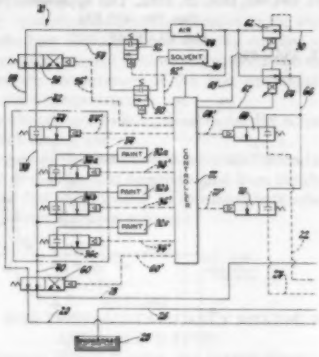
manifold means for selectively coupling the individual fluid sources to the supply lines, and

means for selectively coupling the supply lines to the applicator means including

(a) a pair of pilot operated pressure regulating valves each connected between one of the supply lines and the applicator means operable in response to pilot pressure to selectively regulate paint flow to the applicator means or disconnect the said one supply line from the applicator means whereby selective paint flow from the supply lines to the applicator means and paint pressure is controlled by pilot pressure applied to the respective regulating valves,

(b) pilot operated dump means for selectively exhausting the supply lines, and

(c) pilot pressure control means for selectively directing pilot pressure to each of the valves and the dump means so



that when one pressure regulating valve is actuated to connect one supply line to the applicator device the dump means is actuated to exhaust the other supply line,

whereby when one supply line is flowing paint to the applicator means the other supply line can be flushed with the cleaning fluid.

4,487,368

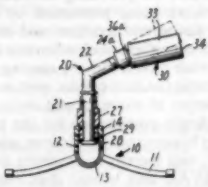
VANE-DRIVEN WOBBLING SPRINKLER DEVICE

Jack F. Clearman, Rte. 4, Blakely, Ga. 31723

Filed Oct. 29, 1982, Ser. No. 432,853

Int. Cl.³ B05B *3/00*

U.S. Cl. 239—229 **9 Claims**



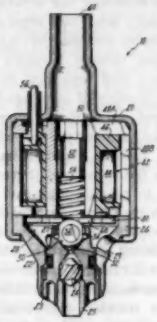
1. A sprinkling device for supplying water to lawns, vegetation, and the like, said device comprising an elongate wobbling water distributor head having an open discharge end axially spaced from and structurally joined to a closed base end, said discharge end comprising at least a sector of an annulus provided with a plurality of radially inwardly extending vanes on its inner peripheral surface, said vanes aligned at a slight angle to the logitudinal axis of said head and terminating substantially short of the center of said annulus, said base end having a hole extending generally axially therethrough said device including a support arm having a tubular neck portion with spaced shoulders, said base end being loosely mounted on said neck between said shoulders so as to have limited radial and axial movement.

4,487,369

ELECTROMAGNETIC FUEL INJECTOR WITH IMPROVED DISCHARGE STRUCTURE

Daniel J. Du Rocher, Roseville, Mich., assignor to Essex Group, Inc., Fort Wayne, Ind.

Continuation of Ser. No. 338,800, Jan. 11, 1982, abandoned. This application Mar. 2, 1984, Ser. No. 583,802
Int. Cl.³ B05B 1/34; F02M 51/06
U.S. Cl. 239—488 1 Claim



1. In an electromagnetic fuel injector including a housing having a flow passage therethrough including an inlet region and a discharge region having a central flow axis, said housing including a tubular opening coaxial with said central flow axis in the discharge region thereof, a valve seat and a valve in said flow passage, electromagnetic actuating means, armature means cooperating with said valve and responsive to energization and deenergization of said electromagnetic actuating means for moving said valve between open and closed positions relative to the valve seat and wherein, when said valve is open, fuel admitted under pressure to said housing inlet region upstream of said valve flows between said valve and said valve seat and through the discharge region downstream thereof where it is discharged from the housing, the improvement wherein:

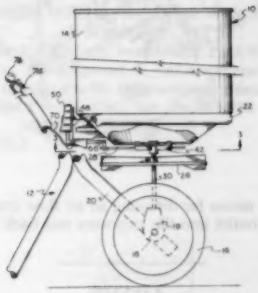
said flow passage discharge region includes sequentially in the downstream direction, a circular metering orifice coaxial with the axis and transparent flow patterning means, the area of said metering orifice normal to the direction of flow being at least as small as the smallest cumulative area of the flow path anywhere downstream thereof in said discharge region, said flow patterning means including first, second and third flow directing means sequentially in the downstream direction, said second flow directing means comprising a cylindrical disc member having a plurality of discrete flow channels extending generally helically in the circumference thereof, each said flow channel having an inlet and having an outlet oriented to direct the flow issuing therefrom at a predetermined skew angle relative to the axis, said housing opening including a cylindrical section and said disc member being positioned in said cylindrical section of said housing opening to occlude fuel flow except through said channels, said disc member being tapered conically at its upstream end to provide said first flow directing means for directing said flow radially outward relative to the axis to the inlets of said disc member flow channels, the cross-sectional area of the flow path along said first flow directing means and normal to the direction of flow being substantially constant, said tubular opening in said housing means being elongated and including a cylindrical exit nozzle inserted thereinto coaxially with the central flow axis, said third flow directing means comprising an annular inclined surface on said exit nozzle to direct fuel issuing from said disc member flow channel outlets radially inward relative to the axis for direct discharge thereafter from the injector, said disc member being additionally conically tapered at its downstream end so as to be symmetrical about a plane normal to the axis to facilitate assembly.

4,487,370

SEED AND FERTILIZER SPREADER

Paul L. Speicher, 911 W. Main, North Manchester, Ind. 46962

Continuation-in-part of Ser. No. 283,655, Jul. 15, 1981, abandoned. This application Mar. 19, 1982, Ser. No. 359,809
Int. Cl.³ A01C 17/00
U.S. Cl. 239—687 5 Claims



1. In a spreader for pulverant material including a hopper having a valve controlled bottom discharge opening, a substantially horizontal rotatable broadcasting member below said hopper discharge opening, means for rotating said broadcasting member, and means for actuating said discharge control valve, the improvement wherein a member constituting a combination dial mount and valve actuating guide is mounted on said hopper, said last named member including a plurality of spaced normally divergent resilient legs each terminating in a hook portion, said hopper bottom having a plurality of apertures spaced from said discharge opening and spaced apart differently than the normal spacing of the hook mounting ends of said legs, said legs being yieldable to fit in said apertures with said hook portions having snap interlocks with said hopper bottom at said apertures, the portion of said hopper bottom at which said legs are interlocked is substantially frusto conical and said legs extend substantially horizontally from said frusto conical portion.

4,487,371

COMMINUTION APPARATUS

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Filed May 13, 1982, Ser. No. 377,653
Int. Cl.³ B02C 18/10, 23/34
U.S. Cl. 241—48 10 Claims

1. A comminution apparatus comprising:

a rotatable, motor-driven cutter member;

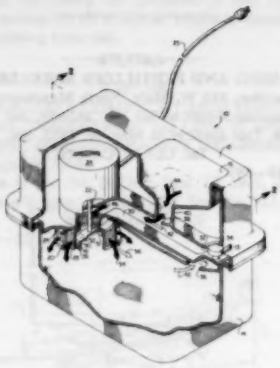
a first screen member surrounding the cutter member, the first screen member having a plurality of elongated slots;

a second screen member enclosing the first screen member in closely spaced relationship therewith, the second screen member having a plurality of elongated slots;

actuator means for selectively positioning said slots of the first screen member relative to said slots of the second screen member;

feed means for introducing a feed into an enclosure formed by said first screen member around the cutter member, comprising a hopper for the feed, an outlet from the

hopper and a conduit extending between the outlet and the enclosure; and



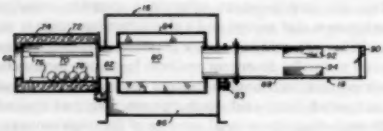
air recycle means for directing an air flow into the conduit past the outlet into the enclosure and back into the conduit.

4,487,372

THERMAL SAND RECLAMATION SYSTEM

Vagn Deve, East Washington, Pa., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Apr. 16, 1982, Ser. No. 369,069
Int. Cl.[3] B02C *19/12*
U.S. Cl. 241—65 4 Claims



1. A system for reclaiming used foundry sand that contains organic matter, dust, fines and metal, the latter being of either a ferrous or nonferrous nature comprising:

a. thermal reclaimer means operative for thermally removing organic matter from the used foundry sand, said thermal reclaimer means including a rotatable housing having a chamber formed internally thereof and in concentric relation thereto so as to be rotatable therewith, said chamber having an inlet opening formed therein at one end thereof through which the used foundry sand to be reclaimed enters said chamber, said chamber having burner means mounted at the other end thereof so as to extend into said chamber, said burner means being operative to heat the used foundry sand in said chamber to a predetermined temperature as said chamber rotates to effect the thermal removal of organic matter from the used foundry sand, said chamber having an outlet opening formed at the other end thereof in surrounding relation to said burner means through which the used foundry sand from which organic matter has been removed exits from said chamber of said thermal reclaimer means;

b. primary cooling means cooperatively associated with said thermal reclaimer means for receiving the used foundry sand therefrom and for effecting the cooling of the used foundry sand subsequent to the removal therefrom of the organic matter, said primary cooling means including a tank containing a cooling medium therein and a chamber mounted for rotation within said tank, said chamber of said primary cooling means having an inlet opening formed therein at one end thereof for receiving the used foundry sand that is to be cooled and having an outlet opening formed therein at the other end thereof through which the used foundry sand exits from said primary cooling means after being cooled in said chamber as said chamber rotates in said tank containing a cooling medium therein;

c. separator means cooperatively associated with said primary cooling means for receiving the used foundry sand therefrom and for effecting the separation of the metal from the used foundry sand, said separator means including a rotatable tubular member having an inlet opening formed at one end thereof through which the used foundry sand enters said separator means, said tubular member having a plurality of openings formed intermediate the ends thereof, each of said plurality of openings having a screen-like member positioned in mounted relation thereto, said tubular member having a discharge opening formed at the other end thereof through which material too large to pass through said screen-like members as said tubular member rotates is discharged; and

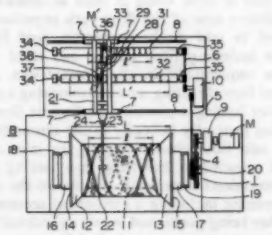
d. scrubber means cooperatively associated with said separator means for receiving the used foundry sand therefrom and for effecting a scrubbing of the used foundry sand, said scrubber means including a scrubber sleeve having a shaft mounted for rotation therewithin, said scrubber sleeve having an inlet opening through which used foundry sand enters said scrubber sleeve and an outlet opening through which used foundry sand exits from said scrubber sleeve, said shaft having a plurality of paddles affixed thereto for rotation therewith, said plurality of paddles through the rotation thereof causing the sand particles of the used foundry sand passing through said scrubber sleeve to rub against one another and thereby be subjected to a scrubbing action.

4,487,373

TRAVERSE TAKE-UP APPARATUS FOR MATERIAL OF INDEFINITE LENGTH

Keiso Hatta, Toyama, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Mar. 10, 1983, Ser. No. 474,159
Claims priority, application Japan, Mar. 29, 1982, 57-49167
Int. Cl.[3] B65H *54/10, 54/32*
U.S. Cl. 242—16 8 Claims



1. A traverse take-up apparatus for material of indefinite length such as thread, tape and the like comprising a winding beam having tapered flanges at the opposite ends thereof and rotatable on a rotary shaft, a beam rotating means for rotating said beam rotary shaft, a material guide means for traversing in parallel to said beam rotary shaft and a traverse distance adjusting mechanism adapted to move said material guide means as said material is wound in successive layers on said winding beam, said traverse distance adjusting mechanism having two parallel traverse screw shafts disposed in parallel to said beam rotary shaft with the traverse distance on one of said traverse screw shafts set for a predetermined minimum winding width

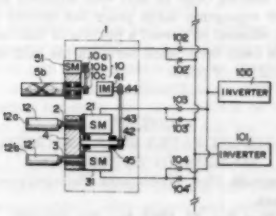
and the traverse distance on the other of said traverse screw shafts set for a predetermined maximum winding width, said traverse distance adjusting mechanism further including a rocker rod threadably engaged to said traverse screw shafts, a slider mounted on said rocker rod and slidable along the length of the same and a screw shaft mounted on said material guide means at right angle to the traverse movement direction of said material guide means and being in threaded engagement with said slider, said screw shaft being mounted on a framework which forms a portion of said material guide means and is movable in parallel to said beam rotary shaft, and the rotations of said beam rotary shaft, said traverse screw shafts and said screw shaft are interlocked with each other under a predetermined speed relationship, wherein said beam rotating means is driven by a rotary motor means, said traverse screw shafts are driven via a speed change means from said rotary motor means, and said screw shaft is driven by a fine adjusting rotary motor means which is supported on said framework, whereby said slider is adapted to be moved along said rocker rod by the rotation of said fine adjusting rotary motor means.

4,467,374

SPINDLE DRIVE TYPE YARN WINDING APPARATUS

Takami Sugioka; Yuzuru Miyake; Shoichi Murakami, and Hideaki Ibuki, all of Matsuyama, Japan, assignors to Teijin Seiki Co. Ltd., Matsuyama, Japan

Filed Oct. 29, 1982, Ser. No. 437,527
Claims priority, application Japan, Nov. 4, 1981, 56-175602
Int. Cl.[3] B65H *54/08, 67/04*
U.S. Cl. 242—18 A 2 Claims



1. A spindle drive type yarn winding apparatus of the automatic bobbin changing type, comprising:

a turret rotatable about an axis;

at least two spindles rotatably disposed on said turret, said spindles being alternately located at a yarn winding position and a standby position and being capable of receiving corresponding bobbins;

a yarn traverse device for traversing a yarn along said spindles;

a traverse synchronous motor for driving said traverse device;

at least two spindle synchronous motors for driving respective ones of said spindles;

wind ratio control means for mechanically adjusting the wind ratio of said yarn winding apparatus to a predetermined value, said means being disposed between said traverse synchronous motor and said traverse device, or between said spindle synchronous motors and the corresponding spindles;

a variable frequency power source for normal winding, said power source being connected during normal winding operation to both said traverse device and one of said spindles located at said yarn winding position, for driving the same at speeds proportional to the frequency of said power source;

an auxiliary power source connected to another one of said spindles located at said standby position;

speed control means connected to said variable frequency power source for controlling said variable frequency power source based on a predetermined winding program, to simultaneously drive said traverse device and said spindle located at the yarn winding position during normal winding, with a constant speed ratio therebetween; and

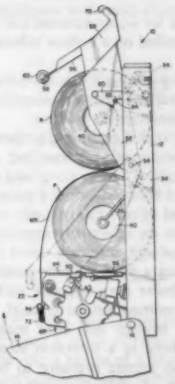
an initial speed adjuster connected to said auxiliary power source for contolling said auxiliary power source to accelerate the spindle located at the standby position to a normal winding speed.

4,487,375

ROLL TRANSFER MECHANISM FOR WEB MATERIAL DISPENSER

Holger Rasmussen, Kilchberg, Switzerland; Paul W. Jespersen, Houston, Tex., and Raymond F. DeLuca, Stamford, Conn., assignors to Georgia-Pacific Corporation, Atlanta, Ga.

Filed Feb. 16, 1983, Ser. No. 466,950
Int. Cl.[3] B65H *19/00*
U.S. Cl. 242—55.3 10 Claims



1. A dispenser for multiple rolls of web material such as paper toweling and the like comprising:

a dispenser chassis adapted to be attached to a wall at a location for web material use, said chassis having primary and reserve support means to rotatably support rolls in primary and reserve dispensing positions, respectively;

a dispenser mechanism on said chassis including mating rollers to lead a web of material out of the dispenser to a user, at least one of said mating rollers having an annular recess formed intermediae the ends thereof;

transfer frame means pivotally mounted on said chassis to swing about an axis parallel to the rotative axes for the rolls as defined by said support means, said frame means having sensing means to sense depletion of web material supplied from the roll carried by said primary support means and tucking means to press a web end portion of the material supplied from the roll carried by said reserve support means into said dispensing mechanism upon such web depletion being sensed, said tucking means being disposed to press the web end portion into said annular recess;

retaining means on said chassis for releasibly retaining said frame means out of the way to facilitate loading rolls onto said support means at said dispensing positions; and

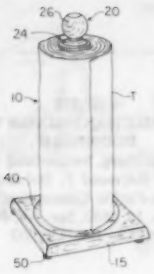
web holding means mounted on said chassis to hold to said chassis a web end portion of the material from a roll in reserve dispensing position until said transfer frame means coacts with said dispensing mechanism to feed web material supplied from such roll.

4,487,376

HOLDER FOR ROLL OF PAPER TOWELS

Fred A. Compton, 513 McGee St., Graham, N.C. 27253

Filed Mar. 21, 1983, Ser. No. 477,165
Int. Cl.³ B65H *19/00*
U.S. Cl. 242—55.54 **4 Claims**



1. A towel holder for a conventional roll of perforated paper towels which are rolled on a hollow tubular core, said holder comprising:

(a) a base member having a substantially flat upper surface and an under surface which is adapted for use on a horizontal or vertical support surface;

(b) a towel support rod extending perpendicularly from the approximate center of said base and adapted to receive thereon said hollow tubular core; said support rod including a elongated bore extending a prescribed distance axialy into the end of said rod opposite said base member;

(c) braking means for selectively impeding the normal rolling tendency of said core as a towel is being torn therefrom comprising a plate member positioned adjacent the end of said tubular core opposite said base member and means for permitting selective axial movement of said plate member toward said base member to provide a compressive force in a direction along the axis of said tubular core to permit pressure to be brought to bear against the ends of said roll of paper towels;

(d) said brake means further including a control knob having an upper portion and a lower base plate larger in diameter than the tubular core of said towel roll; a shaft extending perpendicularly to the undersurface of said base plate for insertion into said elongated bore into said support rod; and said shaft being of a dimension such that it fits loosely into said bore and is of a length slightly less than said bore;

whereby a roll of paper towelling is placed on said support shaft with one end of said roll seated on said base, and said shaft of said control knob is inserted loosely into said axial bore such that when it is desired to remove a towel, the towels are rolled off to the desired length, the control knob base plate is depressed against the end of the towel roll to prevent further unrolling of the towels, and the towels are torn off along the perforated point.

4,487,377

WEB WINDING APPARATUS AND METHOD

Fabio Perini, S. Michele di Moriano, Italy, assignor to Finanziaria Lucchese S.p.A., Lucca, Italy

Filed Apr. 23, 1982, Ser. No. 371,388
Claims priority, application Italy, Aug. 26, 1981, 9502 A/81
Int. Cl.³ B65H *35/10, 17/08*
U.S. Cl. 242—56.8 **15 Claims**

1. In a rewinder constructed and arranged to receive a web of sheet material,

a first winder roll having a channel in the surface thereof,

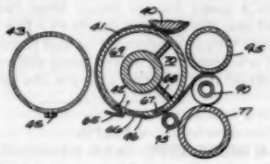
a web separator roll having web separator means

said first winder roll and said web separator roll being operatively interconnected by means which cause them to rotate in synchronism,

the channel in said first winder roll and the means in said web separator roll constructed and arranged so that at selected moments during rotation of said rolls the said means and the said channel are in operative juxtaposition to each other to move said web into said channel a distance in excess of the stretch and tensile characteristics of said web so as to tear said web in said channel,

said web seprator means being a rigid member which forces the web into the channel,

including vacuum means on each side of the channel to hold the web against the first winder roll,



the vacuum means being a plurality of ports disposed closely adjacent and on one side of said channel in said first winder roll so as to hold the tail of said web adjacent the channel after the web separation takes place,

wherein a second set of ports is disposed in the surface of the first winder roll, on the other side of the channel, so as to hold the leading edge of said web adjacent said channel after web separation takes place but spaced sufficiently from the channel to permit a portion of said leading edge to double back upon itself between the said channel and the second set of ports

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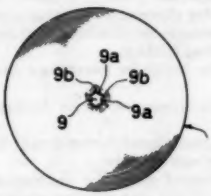
4,487,378

CORELESS TOILET PAPER ROLL AND METHOD FOR MANUFACTURE THEREOF

Masashi Kobayashi, 21-4, Nishimachi, Fujinomiya-shi, Shizuoka-ken, Japan

Filed Sep. 27, 1982, Ser. No. 424,626
Claims priority, application Japan, May 19, 1982, 57-83200
Int. Cl.³ B65H *17/00*
U.S. Cl. 242—68 **22 Claims**



1. A coreless paper roll, comprising:

a roll of paper wherein the innermost plies of said roll of paper define a substantially rigidified, non-collapsible aperture, having a substantially polygonal cross-sectional configuration, capable of removably accommodating a paper holder which can rotatably support said coreless paper roll, and wherein further, all of said paper of said paper roll, including said innermost plies of said roll of paper which define said paper roll aperture, is capable of being readily unrolled for a predetermined paper use,

said substantially polygonally shaped, substantially rigidified, non-collapsible aperture being defined by means of circumferentially arranged, alternatively disposed, radially outwardly extending constrictions, and radially in-

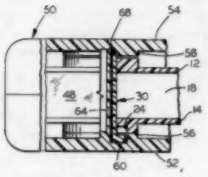
wardly extending bulged portions which have been partially collapsed radially inwardly to a predetermined final extent.

4,487,379

COILABLE TAPE RULE WITH SHIFTING HUB, REEL ASSEMBLY THEREFOR, AND METHOD OF ASSEMBLING

Mark A. Drechsler, Southington, and Edward C. Rutty, Portland, both of Conn., assignors to The Stanley Works, New Britain, Conn.

Filed Dec. 7, 1982, Ser. No. 447,703
Int. Cl.³ B65H *75/48*
U.S. Cl. 242—107 **17 Claims**



1. In a coilable rule, the combination comprising:

A. a casing comprising a pair of mating sections defining a chamber therewithin, one of said sections having a hub seating recess on its inner surface;

B. a reel rotatable within said casing having a cylindrical core, annular end walls of greater diameter than said core portion to provide an annular chamber thereabout, and an axially extending passage therethrough, said reel having a hub seating recess in the outer surface of the end wall adjacent said hub seating recess of said one casing section;

C. an axially shiftable hub having a barrel in said passage of said reel and a flange at the end thereof adjacent said one casing section, said flange and said hub seating recesses being cooperatively dimensioned and configured to lock said flange and thereby said hub against relative rotation, said hub flange being frictionally engageable in said hub seating recess of said reel and shiftable axially into said hub seating recess of said casing to permit said reel to rotate about said barrel; and

D. a recoil spring coiled within said core portion of said reel and having its inner end engaged with said barrel and its outer end extending outwardly of said core portion of said reel.

4,487,380

REELING DEVICE

William King, 79 Allison Rd., Elsternwick, Victoria, 3185, Australia

PCT No. PCT/AU82/00009, § 371 Date Sep. 13, 1982, § 102(e) Date Sep. 13, 1982, PCT Pub. No. WO82/02703, PCT Pub. Date Aug. 19, 1982
PCT Filed Feb. 3, 1982, Ser. No. 422,908
Claims priority, application Australia, Feb. 3, 1981, PE7469
Int. Cl.³ B65H *75/48*
U.S. Cl. 242—107.3 **6 Claims**

1. A reeling device comprising

a reel (3) rotatable about an axis for holding, paying out, and winding in a linearly extendable flexible member:

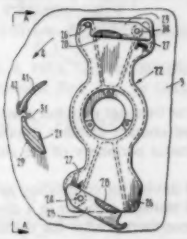
means for biasing said reel in a direction of rotation for winding in said flexible member: and

a latching mechanism adapted to prevent winding in of said flexible member, said latching mechanism including:

a stationary member having an abutment (21), said stationary member having first and second guide surfaces respectively radially inward and radially outward with respect to the axis of rotation of said reel;

a latch member (23; 51, 54) having an abutment (28), said latch member being rotatable with said reel and pivotally attached to said reel so that the abutment (28) of said latch member is movable under centrifugal force during winding in of said flexible member between a latching first position and a non-latching second position that are, respectively, relatively radially inward and relatively radially outward of the axis of rotation of said reel; said abutment (28), when in said first position, describing a circle of relatively small radius as the reel rotates for winding in of said flexible member that intersects with said abutment (21) of the stationary member for preventing winding in of the flexible member; and said abutment, when in the second position, describing a circle of relatively large radius as the reel rotates for winding in of the flexible member that is located radially outward of, and does not intersect with, said abutment (21) of the stationary member for permitting winding in of the flexible member,

said first guide surface of said stationary member being adapted to guide said abutment (28) on said latch member into latching abutment with said abutment (21) on said



stationary member when said abutment (28) on said latch member is describing a circle of rotation during winding in of said reel having a radius of a predetermined magnitude less than said relatively large radius, and wherein said second guide surface of said stationary member is adapted to guide said abutment (28) on said latch member toward said second position and away from abutment with said abutment (21) on the stationary member when said abutment (28) on said latch member is describing a circle of rotation during winding in of the reel having a radius greater than said radius of said predetermined magnitude in consequence of the rate of rotation of the reel exceeding a predetermined magnitude; and

a guide member (41, 42) movable between a latch non-interference position in which said guide member makes no latch preventing contact with said latch member and a latch interference position in which said guide member directs said abutment (28) on said latch member radially outward of the first guide surface, irrespective of the radius of the circle of rotation being described by said abutment (28) on said latch member prior to the latch member contacting said guide member, thereby to prevent latching at any rotational speed of said reel.

4,487,381

WEBBING RETRACTOR

Tatsushi Kubota, Aichi, Japan, assignor to Kabushiki Kaisha Tokai-Rika-Denki Seisakusho, Aichi, Japan

Filed Sep. 22, 1982, Ser. No. 421,260
Claims priority, application Japan, Nov. 6, 1981, 56-178684; Nov. 6, 1981, 56-178685
Int. Cl.³ A62B *35/00*; B65H *75/48*
U.S. Cl. 242—107 **20 Claims**

1. A webbing retractor for housing an occupant restraining

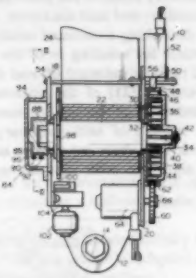
webbing used in a seatbelt system for protecting an occupant in an emergency situation of a vehicle, comprising:

(a) a takeup shaft secured thereto with one end of said occupant restraining webbing;

(b) a resilient member for biasing said takeup shaft in a direction of winding said webbing;

(c) a returning device for moving said resilient member in directions as to decrease and increase a biasing force of the resilient member;

(d) rotation detecting means for detecting rotated positions of the takeup shaft, and comprising a rotary contact member disposed at one end portion of the takeup shaft rotatable in accordance with a rotation of the takeup shaft and



provided on its outer periphery with conductive material and a fixed contact member opposed to and contacting with the outer periphery of the rotary contact member; and

(e) a control device for controlling said returning device to move said resilient member in a direction to decrease the biasing force thereof after the webbing has been fastened to the occupant whereby a retracting force acting upon said webbing is reduced, and for controlling said returning device to move said resilient member in a direction to increase the biasing force thereof when the webbing is unfastened from the occupant, whereby the retracting force is increased so that said webbing is retracted on to the takeup shaft up to a fully retracted state.

4,487,382

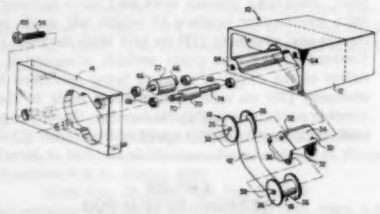
CASSETTE FOR STRAIN RECORDER

John H. Weaver, Carleton Place, Canada, assignor to Leigh Instruments Limited, Carleton Place, Canada

Filed Sep. 3, 1982, Ser. No. 414,820

Int. Cl.³ G03B *1/04*; G11B *15/32*; G01D *15/26*

U.S. Cl. 242—197 **16 Claims**



1. A cassette for a recorder, comprising:

a housing;

a supply bobbin and a take-up bobbin rotatably mounted in said housing, said bobbins being mechanically interconnected for causing rotation of one bobbin a particular amount in one angular direction to produce rotation of the other bobbin the same amount in the other angular direction;

a recording tape in the form of a flat strip of resilient material, the tape having its one end attached to and wound around the hub of the supply bobbin and the tape having its other end attached to and windable around the hub of the take-up bobbin as it unwinds from the supply bobbin, the direction in which the tape extends around the bobbins being for causing the angular direction in which the tape moves around the take-up bobbin in the take-up direction to be opposite to the angular direction in which the tape moves as it is unwound from the supply bobbin.

4,487,383

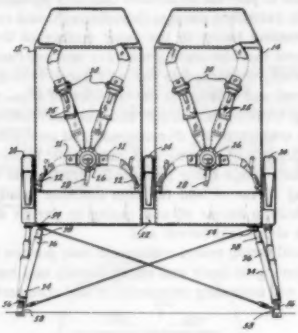
CRASHWORTHY REAR-FACING PASSENGER SEAT FOR FIXED WING AIRCRAFT

Bernard Mazelsky, West Covina, Calif., assignor to ARA, Inc., City of Industry, Calif.

Filed Sep. 29, 1982, Ser. No. 426,747

Int. Cl.³ B64D *25/04*, *11/06*

U.S. Cl. 244—122 R **15 Claims**



8. A rearward facing crashworthy seat for fixed wing aircraft comprising:

seat means oriented to face in the opposite direction to the direction of flight of the aircraft;

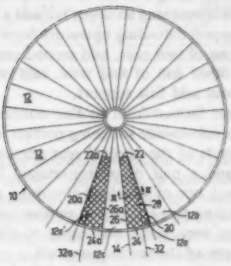
energy absorber means disposed between said seat means and the floor of the aircraft, said energy absorber means having the capability of operating in both tension and compression, at least one of said energy absorber means absorbing energy in a first stage following a crash and a second stage following said first stage, and absorbing energy at a lower level of force during said first stage following a crash and at a higher level of force in the second stage following said first stage,; and

stabilizing rod means disposed adjacent said energy absorber means and attached between said seat means and the floor of said aircraft, absorbing energy of a crash and adapted so that said seat means accomodates floor distortions of the aircraft, to prevent separation of said seat means from the aircraft and to prevent yawing.

4,487,384
PARACHUTE CANOPY

Harald V. G. Astrand, Karlsborg, Sweden, assignor to Irvin Fallskarms AB, Avesta, Sweden

PCT No. PCT/SE81/00373, § 371 Date Aug. 3, 1982, § 102(e) Date Aug. 3, 1982, PCT Pub. No. WO82/02030, PCT Pub. Date Jun. 24, 1982
PCT Filed Dec. 14, 1981, Ser. No. 414,249
Claims priority, application Sweden, Dec. 12, 1980, 8008747
Int. Cl.³ B64D 17/20
U.S. Cl. 244—152 6 Claims

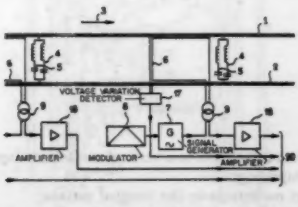


1. A generally circular parachute canopy having inner and outer surfaces defined by a plurality of radially extending gores which are assembled in edge to edge relationship along radially extending joints the improvement comprising an elongated radially extending slit formed along at least a portion of one of the gores contiguous to the joint with an adjacent gore, said at least one of the gores having a free edge portion along said slit which edge portion is selectively removable with respect to said adjacent gore, an air-pervious material attached to the outer surface of the canopy and extending over the entire length of said slit, and pull means attached adjacent to said free edge of said one of the gores and extending from the inner surface of the canopy to a point remote from said slit whereby said one of said gores is normally retained in a closed position with respect to said adjacent gore closing said slit therebetween as a parachute is in use but being selectively openable by exerting a downward force on said pull means thereby separating said free edge of said one of the gores from said adjacent gore thereby forming an air opening therethrough.

4,487,385
METHOD OF CONTROLLING A RAILROAD CAR IN AUTOMATIC DRIVE

Jean P. Salmon, Aulnay sous Bois, France, assignor to Jeumont-Schneider, France

Filed Jan. 26, 1982, Ser. No. 342,777
Claims priority, application France, Jan. 29, 1981, 81 01671
Int. Cl.³ B61L 25/00
U.S. Cl. 246—122 R 8 Claims



1. A method of presence and position detection of a train automatically running on a pair of metal tracks, said tracks being divided into information transmission zones defined by resonant shunts across the tracks; a ground station having a conductor loop with transverse sections arranged between said tracks in one zone, a source of modulated information signals being connected to said loop; said train being equipped with a receiver for receiving modulated signals from said loop, and a transmitter, said method comprising

on said train:

generating an A.C. voltage, inducing said voltage in said tracks and transmitting said induced voltage through said tracks to said loop; and

receiving said modulated information signals and, using said received modulated information signals, detecting when said train passes directly over said transverse sections of said conductor loop to produce a train position signal; and

at said ground station:

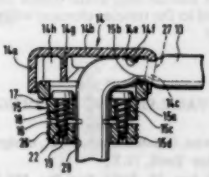
receiving said induced voltage in said loop to produce a positive indication of the passage of said train into said zone; and

monitoring the voltage of said modulated information signals produced across said tracks by said source and detecting a variation in said voltage due to a load variation when said train enters said zone to produce a negative indication of the passage of said train into said zone.

4,487,386
STRAIN RELIEF ASSEMBLY FOR ANGULAR CABLE ATTACHMENT

Karl Hehl, Arthur-Hehl-Strasse 32, 7298 Lossburg 1, Fed. Rep. of Germany

Filed Mar. 4, 1982, Ser. No. 354,603
Claims priority, application Fed. Rep. of Germany, Mar. 4, 1981, 3108085
Int. Cl.³ F16L 5/00
U.S. Cl. 248—56 10 Claims



1. A strain relief assembly for the angular through-feed and attachment of a cable to the wall of a receptacle or enclosure, the assembly comprising in combination;

a threaded clamping sleeve having an outwardly cylindrical main body with an externally threaded length portion and an enlarged clamping collar adjoining the main body on the outer axial extremity thereof, so as to form an axially inwardly facing annular shoulder, the main body being insertable into an aperture in the wall of said receptacle or enclosure and positionable against the outer surface of the latter by means of its annular shoulder, the clamping sleeve further having an axial passage for the accommodation therein of an axially oriented length portion of the cable;

means for securing the threaded clamping sleeve in the aperture of said receptacle or enclosure; and

a cap-shaped clamping cover adjustably clampable to the axially outer side of the threaded clamping sleeve by means of a plurality of threaded fasteners reaching axially through the clamping cover into the threaded clamping sleeve, the clamping cover having an end wall adjoined by a substantially cylindrical axially inwardly extending side wall of a diameter which is slightly larger than the diameter of the clamping collar of the clamping sleeve, so as to axially overlap the latter in a clamped configuration, the clamping cover having in its side wall an axial recess which, in the clamped configuration, forms a passage for a radially oriented length portion of the cable, pinching

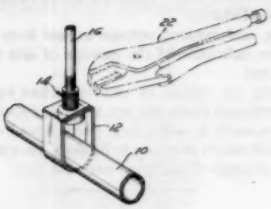
the latter between it and the clamping collar of the threaded clamping sleeve.

4,487,387

COMPOSITE PIPE HANGER RING NUT

Richard W. Heath, La Habra, Calif., assignor to Tolco Incorporated, Brea, Calif.

Filed May 3, 1982, Ser. No. 374,179
Int. Cl.³ E21F *17/02*
U.S. Cl. 248—59 **12 Claims**



1. A composite pipe hanger nut comprising:

a tubular element for receiving a pipe hanger rod, an outwardly extending flange formed on one end of the element and a recess formed in the outer axial end of said flange; and

a nut positioned in said recess having a threaded interior bore for threading into the pipe hanger support rod, the nut threads being sufficiently strong to support a pipe or other such load to be carried by the pipe hanger nut;

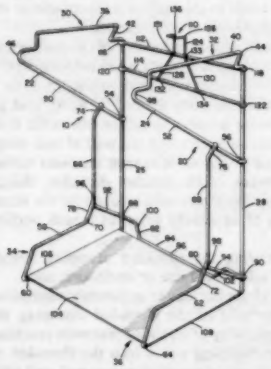
said recess and nut having walls which cooperate so that torque applied to the tubular element will rotate the nut on said pipe rod.

4,487,388

HOLDER FOR FACILITATING LOADING OF PLASTIC BAGS

Alexander R. Provan, Canandaigua, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 25, 1983, Ser. No. 488,516
Int. Cl.³ B65B *67/04*
U.S. Cl. 248—97 **10 Claims**



1. A holder for facilitating loading of articles in a plastic bag removed from a stack of bags, each one of said bags having an open mouth and integral upwardly extendable handle loops disposed on opposite sides of said mouth, said holder comprising:

a pair of spaced mirror-imaged side members, each of said side members being formed with a continuous wire bent to provide a vertical rear portion, an arm portion extending forwardly form the upper end of said rear portion, and a base portion extending forwardly from the lower end of said rear portion,

said arm portion being formed into an upwardly extending horizontally elongated tab with a rearwardly projecting protrusion, a forwardly extending nose and a downwardly and rearwardly extending first support terminating at one end of said wire, said one end being crimped about said rear portion,

said base portion being formed into horizontally extending parallel rails comprising an upper rail and a lower rail with a second support extending upwardly from the rear end of the upper one of said rails, said second support terminating at the other end of said wire, said other end being crimped about said first support,

a brace member formed from another continuous wire bent to provide a side-to-side stiffening portion interconnecting the lower ends of the vertical rear portions of said side members, and a pair of mirror-imaged load absorbing portions, each one of said load absorbing portions terminating at a respective end of said another wire, each end of said another wire being connected to the bottom of a respective one of the second supports,

holding means interconnecting said vertical rear portions at the upper ends thereof for holding said stack of bags, and

means interconnecting each of the lower one of said rails for providing a horizontal support surface,

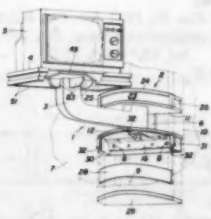
whereby a user removes the topmost bag from said stack of bags, places each of said handle loops of the bag on a respective one of the arm portion tabs, loads the bag, and removes the loaded bag from said holder by lifting said handle loops from the tabs.

4,487,389

WALL MOUNTED DEVICE FOR SUPPORTING ARTICLES

Donald H. Ziegler, Rte. 1, School Rd., Appleton, Wis. 54915

Filed Nov. 17, 1982, Ser. No. 442,289
Int. Cl.³ A47G *29/00*
U.S. Cl. 248—282 **19 Claims**



1. A device attachable to a vertical surface for supporting an article, comprising:

a bracket mountable to the vertical surface;

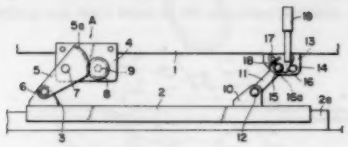
a supporting arm pivotally mounted at its inner end on said bracket and extending outwardly therefrom, said arm includes reinforcing means at its inner end; and

an article-supporting platform rotatably mounted at the outer end of said arm.

4,487,390
VEHICULAR SEAT HEIGHT ADJUSTING DEVICE

Norio Miyashita, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 27, 1982, Ser. No. 424,594
Claims priority, application Japan, Mar. 15, 1982, 57-40562
Int. Cl.³ F16M *13/00*
U.S. Cl. 248—396 6 Claims

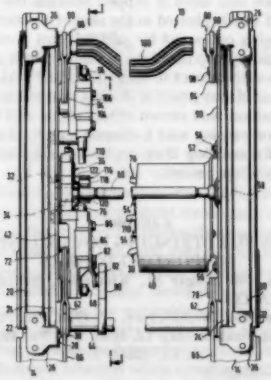


1. Apparatus for adjusting the height of a seat with respect to the body of a vehicle, comprising, in combination: a first link pivotally connected at its lower end to a support member on the body and pivotally connected at its upper end to a front portion of the seat, means for turning said link about its lower pivotal connection for raising and lowering the front portion of the seat, a member fixed to the rear portion of the seat and provided with a slot, a second link pivotally connected at its lower end to said support member and having a pin at its upper end received in said slot, and releasable means for maintaining the pin at one end of the slot, in which position the first and second links are maintained in substantially parallel relationship for raising and lowering the seat uniformly upon turning of said first link and only raising and lowering the front portion of the seat upon actuation of said releasable means to allow movement of said pin in said slot.

4,487,391
SEAT ADJUSTMENT MECHANISM PARTICULARLY FOR A MOTOR VEHICLE SEAT

Hans Rampel, Ahorn; Emil Dinkel, and Volkmar Schulz, both of Coburg, all of Fed. Rep. of Germany, assignors to Metallwerk Max Brose GmbH & Co., Coburg, Fed. Rep. of Germany

Filed Jan. 8, 1982, Ser. No. 338,102
Claims priority, application Fed. Rep. of Germany, Jan. 26, 1981, 3102402
Int. Cl.³ F16M *13/00*
U.S. Cl. 248—429 19 Claims

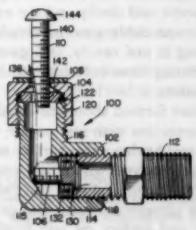


1. A seat adjustment mechanism particularly for the seat of a motor vehicle comprising:
a seat member;
motor means for adjustably moving said seat member between a lower end position and a higher end position;
transmission means including at least two mutually engaging transmission parts operatively interposed between said seat member and said motor means, said transmission parts being mounted on a base member; and
braking means mounted on said base member for applying a braking force on one of said two mutually engaging parts only when said part is moving in a first direction relative to said base member, said first direction corresponding to a movement of said seat member toward said lower end position, said braking means including a freewheeling system, which renders said braking means inoperative only when said one part is moving into a second direction opposite to said first direction, said second direction corresponding to a movement of said seat member toward said higher end position, whereby during movement of said seat member toward said lower end position said two parts are mutually engaging under a prestressing force depending on said braking force.

4,487,392
RADIATOR VENT VALVE

Lewis A. Eckenrode, Jr., 284 Philadelphia Ave., Chambersburgh, Pa. 17201

Continuation-in-part of Ser. No. 196,126, Oct. 10, 1980,. This application Sep. 13, 1982, Ser. No. 417,565
Int. Cl.³ F16K *47/00*
U.S. Cl. 251—121 14 Claims



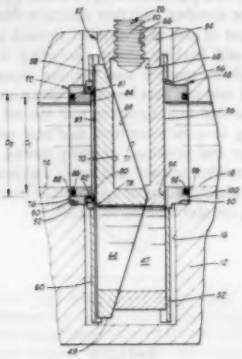
1. A vent valve for use with a radiator comprising:
a conduit adapted to be placed in fluid communication with a radiator, said conduit having a first portion, a second portion extending transversely therefrom, an upper outlet port in fluid communication with said second portion, and a hollow interior extending through said portions of said conduit;
a first blocking rod supported within said first portion, said first blocking rod having at least one opening to provide a vent passage into said hollow interior of said conduit, first means for condensing water from the air venting from the radiator comprising said first rod and said first portion forming a first constricted area between the exterior of said first rod and the interior surface of said first portion; and
a second blocking rod mounted adjacent to said upper outlet port and extending into the hollow interior of said second portion, second means for condensing water from the air venting from the radiator comprising said second rod and said second portion forming a second constructed area between the exterior of said second rod and the interior surface of said second portion.

4,487,393

GATE VALVE HAVING A PRESSURE-SECURED SEAT

Duane M. Eagen, Marblehead, Mass., assignor to Barton Valve Company, Inc., Shawnee, Okla.

Filed Jun. 10, 1982, Ser. No. 387,007
Int. Cl.³ F16K 3/00
U.S. Cl. 251—328 2 Claims



1. A gate valve comprising:

a valve body having a cavity formed therein;

an inlet providing communication between said cavity and the exterior of said body;

an outlet aligned with the inlet and providing communication between said cavity and the exterior of said body;

an axially expandable gate mounted for selected vertical positioning in said cavity, said gate including an opening for permitting flow between said inlet and outlet in one gate position;

a counterbore formed about the circumference of said inlet at its intersection with said cavity;

an annular seat having a rear surface and a front surface, said seat being received within said counterbore so that said rear surface is engaged with said valve body and said front surface is presented toward said cavity;

an annular seal surface on said front surface of said seat, having a sealing diameter;

a recess formed in said front surface of said seat radially inwardly from said annular seal surface, said recess having an outside diameter and being in fluid communication with said inlet regardless of valve gate position;

expansion means for moving said gate against said front surface of said seat in another gate position for sealing between said gate and said front surface;

an annular seal having a greater elasticity than said annular seal surface disposed between said rear surface of said seat and said valve body, said annular seal having a sealing diameter smaller than said sealing diameter of said annular seal surface and smaller than said outside diameter of said recess;

a second counterbore formed about the circumference of said outlet at its intersection with said cavity;

a second annular seat having a rear surface and a front surface, said second seat being received within said second counterbore so that said front surface of said second seat is presented toward said cavity; and

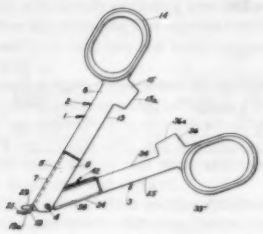
a second annular seal surface on said front surface of said second seat for sealing between said second seat and said gate and responsive to inlet pressurization.

4,487,394

EXTRACTOR FOR SURGICAL STAPLES

Robert G. Rothfuss, Bellevue, Ky., and David K. Kuhl, Cincinnati, Ohio, assignors to Senco Products, Inc., Cincinnati, Ohio

Filed Apr. 14, 1982, Ser. No. 368,100
Int. Cl.³ B25C 11/00; A61B 17/04
U.S. Cl. 254—28 16 Claims



1. A manually actuated extractor for a surgical staple of the type having, when implanted in the skin of a patient, an exposed crown and opposed L-shaped skin-engaging legs, said extractor comprising an upper handle and a lower handle each having a forward and a rearward end, said handles being pivotally joined together near their forward ends and being manually shiftable between open and closed positions, said upper handle terminating at its forward end in a pair of thin, laterally extending stop members with a slot located therebetween, said laterally extending stop members having coplanar staple leg-contacting forward portions lying at an obtuse angle to said upper handle, a thin, U-shaped anvil comprising a base portion and substantially parallel legs, with each of said anvil legs extending to and joining said forward portion of one of said laterally extending stop members, said anvil legs being located to either side of said slot, said anvil being substantially coplanar with said stop member forward portions which extend laterally of said anvil legs, said lower handle terminating at its forward end in a thin blade, said blade being shiftable by said lower handle such that when said handles are shifted from said open to said closed position, said blade shifts from a normal position extending through said slot and lying above said anvil downwardly through said U-shaped anvil between said anvil legs to a staple reforming position therebelow, there being clearance between said blade and each of said anvil legs at least equal to the maximum cross sectional dimension of said staple crown, whereby when said anvil is slipped beneath the crown of a staple formed and implanted in the skin of a patient, with said staple legs being contacted by said forward portions of said laterally extending stop members to assure proper alignment of the extractor with respect to said staple, and said handles are shifted to their closed position shifting said blade to its staple reforming position, said crown of said staple will be reformed into a U-shape causing said L-shaped legs to shift upwardly and outwardly enabling them to be lifted by said extractor from the skin of the patient.

4,487,395

APPARATUS FOR STRINGING POWER LINES ACROSS SUPPORTING TOWERS

Paul Despins, 380 Bingay St., Kimberley, British Columbia, Canada V1A 1X4

Division of Ser. No. 207,127, Nov. 17, 1980, Pat. No. 4,386,758.
This application May 12, 1983, Ser. No. 493,953
Int. Cl.³ B66D 1/36
U.S. Cl. 254—134.3 R 2 Claims

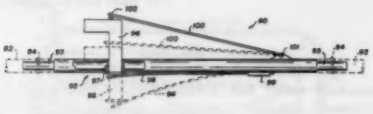
1. Apparatus for stringing a line across supporting towers using a helicopter trailing a hoisting cable, said apparatus comprising;

a needle having leading and trailing ends,

means for detachably securing one end of the line to the trailing end,

a plurality of latch hooks longitudinally spaced and slidably supported along the needle between the leading and trailing ends for reciprocatory movement between a normal extended positional and a retracted position, said latch hooks projecting outwardly from the needle and being directed towards the trailing end,

spring means connecting each latch hook to the needle and urging said latch hook to the extended position,



a pressure bar extending forwardly and downwardly from each latch hook adapted to be engaged by a part of the supporting tower to move said hook to the retracted position, and

a hanger attachable to the hoisting cable for releasably gripping the needle whereby said needle can be flown to a position projecting across a part of a supporting tower and be detachably secured thereto by one of the latch hooks.

4,487,396

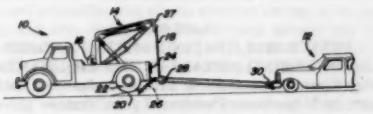
SCOTCH BLOCK ATTACHMENT FITTING

Frederick M. Hoffman, 600 Holgate Ave., Defiance, Ohio 43512

Filed Sep. 14, 1983, Ser. No. 532,060

Int. Cl.³ B66D *1/36*; B60T *1/04*

U.S. Cl. 254—327 **8 Claims**



1. A wrecker for towing a load such as a broken-down automobile and the like, the wrecker including winching means for winching an automobile into towing position at the rear of the wrecker, first securement means associated with the rear bumper of the wrecker for releasably attaching a left-hand scotch block chain and a left-hand snatch block and pulley for a towing cable to the bumper at a first common location on the bumper, and second securement means associated with the rear bumper of the wrecker for releasably attaching a right-hand scotch block chain and a right-hand snatch block and pulley for the towing cable to the bumper at a second common location on the bumper, whereby when winching a load to towing position, forces exerted on the bumper due to tension developed in the scotch block chains are substantially counterbalanced by forces exerted on the bumper by tension developed in the cable.

4,487,397

METHOD FOR FLAME SPRAYING OF GUNITE ON LINING OF METALLURGICAL UNITS

Veniamin V. Antonov; Jury I. Bat, both of Donetsk; Edvin I. Gamalei, Temirtau; Fedor E. Dolzhenkov, Donetsk; Semen A. Donskoi, Temirtau; Valentin A. Kulichenko, Temirtau; Oleg I. Tischenko, Temirtau; Evgeny D. Shtepa, and Viktor M. Chervonenko, both of Donetsk, all of U.S.S.R., assignors to Donetsky Nauchno-Issledovatelsky Institut Chernoi Metallurgii, Donetsk, U.S.S.R.

PCT No. PCT/SU80/00024, § 371 Date Dec. 18, 1980, § 102(e) Date Dec. 18, 1980, PCT Pub. No. WO80/02320, PCT Pub. Date Oct. 30, 1980

PCT Filed Feb. 13, 1980, Ser. No. 227,064

Claims priority, application U.S.S.R., Apr. 16, 1979, 2745351

Int. Cl.³ C21C *5/44*

U.S. Cl. 266—44 **3 Claims**

1. A method for flame spraying of gunite on the lining of metallurgical units, comprising:

delivering a mixture of a refractory material and fuel in a central symmetrical flow;

delivering oxygen in a tapering annular flow rotating about its axis and concentric with the flow of said mixture;

heating and fusing said refractory material in a high-temperature flame;

applying particles of said refractory material to the surface of said lining; and

the ratio between the rotational momentum of said oxygen flow and the flow momentum of said mixture is 2.8 to form a funnel-shaped flame.

4,487,398

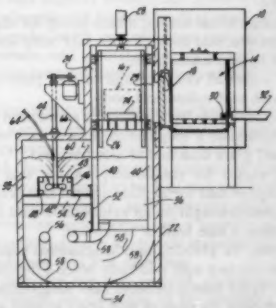
SALT BATH QUENCHING APPARATUS

Joseph A. Lincoln, Milford, and William A. Keough, Bloomfield Hills, both of Mich., assignors to Atmosphere Furnace Company, Wixom, Mich.

Division of Ser. No. 304,190, Sep. 21, 1981, Pat. No. 4,431,464. This application Nov. 7, 1983, Ser. No. 548,969

Int. Cl.³ C21D *1/607*, *1/64*

U.S. Cl. 266—120 **10 Claims**



1. A salt bath quenching arrangement comprising a quench

tank containing a molten salt bath, said tank having opposite side walls and a bottom wall, a vertical partition wall in said tank extending between opposite side walls and dividing the tank into an agitation zone and a quench zone, said partition wall being common to said two zones so that the agitation zone extends laterally to one side of the partition wall and the quench zone extends laterally to the opposite side of said partition wall, the upper edge of the partition wall being disposed below the level of the molten salt so that the upper portions of the agitation and quench zones are in direct communication above the upper edge of the partition wall, the lower edge of the partition wall being disposed above the bottom wall of the tank so that the lower portions of the agitation and quench zones are in direct communication below the lower edge of the partition wall and means for circulating the molten salt between said two zones while vigorously agitating the bath in the agitation zone and simultaneously causing the bath in the quench zone to assume a quiescent condition, said means comprising means in the agitation zone for producing two high volume, high velocity flow paths in the agitation zone, one of said flow paths being directed vertically upwardly in the agitation zone and the othere being directed vertically downwardly in the agitation zone.

4,487,399

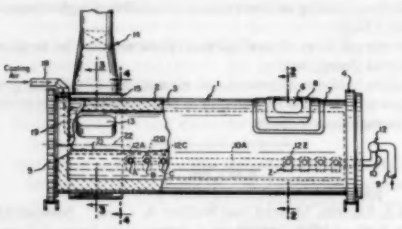
CONVERTER FOR REFINING LIQUID METAL

Allan F. Tittes; Kenneth H. Larson, both of Claypool; Elmer E. Burton, Phoenix, and Kennith L. Britton, Claypool, all of Ariz., assignors to Inspiration Consolidated Copper Company, Claypool, Ariz.

Division of Ser. No. 208,400, Nov. 19, 1980, Pat. No. 4,396,181. This application Jul. 12, 1983, Ser. No. 513,085

Int. Cl.³ C21C *5/38*

U.S. Cl. 266—158 **12 Claims**



1. A hood for collecting hot gases from an opening in a cylindrical body which rotates on a longitudinal axis comprising:

(a) a circumferential sealing means along the edges of said hood in circumferential and frictional contact with said body;

(b) a longitudinal sealing means along the edges of said hood in longitudinal contact with said body and including

(i) a hinged metal plate,

(ii) a curved convex edge of said plate in axial contact with said cylindrical body,

(iii) a rotatable bar disposed in a direction along said hood parallel to a longitudinal axis of said cylindrical body, said plate attached to said bar, and

(iv) means for rotationally biasing said curved convex edge of said metal plate against said body, and having a counterweight on an extension of said bar which penetrates a side wall of said hood;

(c) means for pivoting said longitudinal sealing means away from contact with said body when a deposit of material on said body passes beneath said longitudinal seal, thereby permitting rotation of said body around said longitudinal axis; and

(d) a gas seal between said bar and said hood structure.

4,487,400

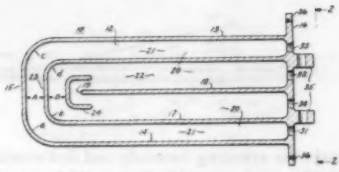
COOLING PLATE

William E. Gheen, Center Valley, and Millet L. Wei, Wescosville, both of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Continuation of Ser. No. 343,065, Jan. 27, 1982, abandoned, which is a continuation of Ser. No. 166,711, Jul. 7, 1980,. This application Jul. 27, 1983, Ser. No. 517,046

Int. Cl.³ F22B *37/00*

U.S. Cl. 266—193 **4 Claims**



1. A cooling plate for insertion in the lining of a furnace, comprising a top surface and a bottom surface, a sidewall having an inner side and connecting said top and bottom surfaces in spaced relation and extending in a loop around a nose section at one end of said cooling plate; a tail flange having openings for the passage of cooling water therethrough enclosing the other end of said cooling plate to form a closed chamber within said cooling plate; a first partition wall spaced from said inner side of said sidewall and forming with said sidewall a first cooling water channel, said first partition wall starting adjacent said tail flange forming a loop around said nose section; a second partition wall inside said first partition wall extending outwardly from said tail flange toward said nose section and having a terminus spaced from said first partition wall forming a second cooling water channel; a horseshoe-shaped baffle provided in at least one of said first and second cooling water channels comprising a single, substantially continuous U-shaped portion located in said cooling water channel at the nose section thereof with leg portions extending parallel to said second partition wall and from said U-shaped portion toward said tail flange for a distance of at least about two inches, said baffle, at a cooling water flow rate of 35 gpm, increasing the velocity of flow of cooling water to 2.59 ft./sec. in the cooling water channel wherein said baffle is provided, when the flow rate is 3.65 ft./sec. in the cooling water channel wherein said baffle is not provided, whereby stagnant zones are avoided.

4,487,401

DEVICE FOR HEATING, MIXING AND/OR TRANSFERRING METALS IN THE LIQUID STATE

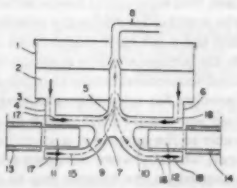
Charles Vives, Chateaurenard, France, assignor to Societe de Vente de L'Aluminum Pechiney, Lyons, France

Filed Nov. 17, 1982, Ser. No. 442,276

Claims priority, application France, Dec. 8, 1981, 81 23330

Int. Cl.³ F27D *11/06*

U.S. Cl. 266—234 **10 Claims**



1. A device for heating, mixing and/or transferring metals in the liquid state comprising a chamber for holding the liquid,

the lower section of said chamber communicating with a plurality of channels that converge at one point and which are formed to circulate the liquid, one of the channels being extendable into the interior of the chamber by a pipe that leads out of the chamber wherein each of the non-extendable channels defines a cavity along its axis, an inductor core being in communication with the interior of said cavity, said inductor core being energized by a low frequency alternating current, each non-extendable channel forming an annular zone about said cavity, the non-extendable channels being formed relative to the cavities whereby the axis of each channel is located in a vertical plane and forms relative to horizontal an upwardly directed angle of less than 60°.

4,487,402

VIBRATION DAMPER DEVICE

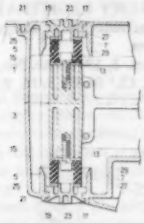
Yoshiaki Takayanagi, Higashiyamato, and Takao Matsunaga, Tachikawa, both of Japan, assignors to Komatsu Zenoah Co., Japan

Filed Jul. 19, 1982, Ser. No. 399,256

Claims priority, application Japan, Jul. 20, 1981, 56-106557[U]

Int. Cl.³ F16F *15/02*

U.S. Cl. 267—141.2 **3 Claims**



1. A vibration-damping device for damping transmission of vibrations between a first assembly and a second assembly, said first assembly having a fitting hole formed therethrough, said device comprising:

first arcuate projections projected radially inwardly from the internal wall of said fitting hole;

second arcuate projections formed on the internal wall of said fitting hole, said second projections being axially spaced from and different in angular phase from said first projections;

an elastic member being interposed between said first and second assemblies and fixedly secured at its one end to said second assembly, said elastic member having at its opposite end first fitting members formed around the outer periphery thereof for abutting engagement with said first arcuate projections on the internal wall of said fitting hole; and a head adapted to be fitted in said fitting hole and having second fitting members formed on the outer periphery thereof, said second fitting members being in abutting engagement with said second projections on the internal wall of said fitting hole when said head is turned through a certain angle relative to said first assembly.

4,487,403

BENCH MOUNTED WORKPIECE CLAMPING STRAIGHTEDGE

Russell W. Burge, 21140 Covina Hills Rd., Covina, Calif. 91724

Continuation of Ser. No. 175,292, Aug. 4, 1980, abandoned, which is a continuation of Ser. No. 970,559, Dec. 18, 1978, abandoned. This application Aug. 26, 1982, Ser. No. 411,602

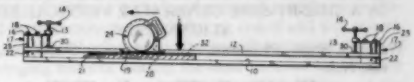
Int. Cl.³ B25B *3/00*

U.S. Cl. 269—2 **1 Claim**

1. A workpiece clamping straightedge apparatus for use with a working surface, comprising:

a vertically movable straightedge member being capable of firmly clamping a workpiece between itself and said working surface, said member presenting a straight edge to guide a tool across and/or through said workpiece,

at least one clamping means secured to an end portion of said member, said clamping means being capable of lifting said member away from said workpiece and capable of lowering said member into contact with said workpiece, thereby firmly clamping said workpiece between said member and said working surface,



at least one mounting means for securing said clamping means to said working surface, said mounting means comprising a vertical member rigidly secured to said working surface and wherein said clamping means is adjustably connected to said mounting means, and said mounting means including an adjustable support means to support an end portion of said member when said member is in contact with said workpiece, to thereby provide downward bowing and reverse camber in said member.

4,487,404

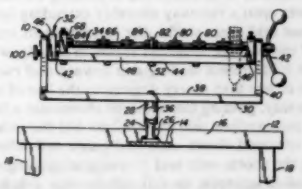
SERVICE RACK FOR FUEL INJECTORS

Eloy J. Martinez, 2450 Medallion Dr., Union City, Calif. 94587

Filed Jul. 2, 1982, Ser. No. 394,805

Int. Cl.³ B23Q *3/00*

U.S. Cl. 269—15 **7 Claims**



1. A service rack for inspection and service of a plurality of vehicle fuel injectors comprising:

a. a rigid support structure;

b. a support bracket connected to the support structure, wherein said support bracket is connected to said rigid support structure by swivel means for swivel of said support bracket about a vertical axis;

c. a support rack assembly having a horizontal rack bed for support of a plurality of fuel injectors;

d. pivotal connection means connecting said support rack assembly to said support bracket for pivot about a horizontal axis, wherein said support bracket has an elongated horizontal member with two end arms and said rack bed has end members, said pivotal connection means comprising journal pins between said end arms and said end members;

e. a clamping mechanism operably connected to said support rack having a transport means for clamping a plurality of fuel injectors supported in said rack bed for servicing, wherein said clamping mechanism comprises a transport screw rotatably connected to each of said end members of said support rack assembly, said transport screw having means for rotating said screw, and a transportable vice member threadably connected to said transport screw and moveable between said end members;

wherein said rack bed has two parallel, elongated seating members arranged on each side of the centrally located transport screw, between said end members of said rack bed, said seating members fixed to said end members, said

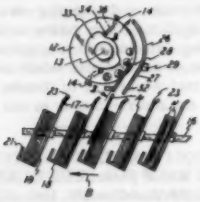
seating members being constructed with means for supporting and positioning a plurality of injectors in pairs on each side of said transport screw in a uniform manner between one of said end members and said transportable vice member, whereon on clamping by said vice member the plurality of injectors are retained in a uniform position.

4,487,405

METHOD AND APPARATUS FOR SHEET GATHERING IN A SIDE-BY-SIDE GENERALLY VERTICAL EDGE ALIGNMENT

Walter J. Stobb, Pittstown, N.J., assignor to Stobb, Inc., Clinton, N.J.

Filed Mar. 29, 1983, Ser. No. 472,725
Int. Cl.³ B65H *39/02*
U.S. Cl. 270—58 **7 Claims**



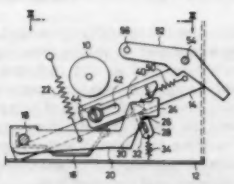
1. In a sheet gathering method for collecting a plurality of folded sheets together from a row of sheet stacks, removing sheets from said sheet stacks and depositing the removed sheets into stacks onto a raceway movably extending horizontally in a line past said sheet stacks, the improvement comprising the steps of moving the removed sheets in an edgewise direction with the fold thereof leading and toward said raceway and at an angle of less than ninety degrees to the line of movement of said raceway, guiding the removed sheets into a linear path on a guide intermediate said sheet stacks and the raceway, releasing the removed sheets onto said guide and subsequently depositing the sheets onto said raceway at said angle slightly off a vertical orientation in full side-by-side relation with the leading folded edges of the removed sheets being lowest whereby the stacks on said raceway are inclined on edge, and supporting the side-by-side sheets on said raceway and in the orientation slightly off vertical.

4,487,406

CASSETTE TYPE APPARATUS FOR FEEDING PAPERS

Akio Kabashima, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Jan. 21, 1983, Ser. No. 459,911
Claims priority, application Japan, Mar. 8, 1982, 57-36277
Int. Cl.³ B65H *1/08*
U.S. Cl. 271—127 **7 Claims**



1. A cassette type apparatus for feeding papers from a cassette insertable into a machine having a feed roller, comprising:

a first lever commonly rotatable with a pressing member;

first means for biasing said first lever and said pressing member towards said feed roller;

a block for selectively engaging said first lever, said first lever being in a retracted state when engaged with said block;

means for rotatably mounting said block;

a slider engageable with said cassette and said block and slidable with said cassette as said cassette is inserted into said machine, for rotating said block, rotation of said block disengaging said first lever allowing said pressing member to urge said inserted cassette towards said feed roller; and

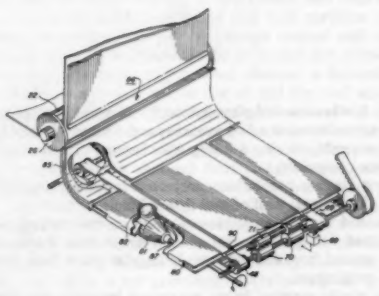
reset lever means for reengaging said first lever and said block.

4,487,407

TRAIL EDGE COPY REGISTRATION SYSTEM

LeRoy A. Baldwin, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 3, 1979, Ser. No. 81,413
Int. Cl.³ B65H *5/16, 9/10*
U.S. Cl. 271—233 **2 Claims**



1. In a copier system having an image processor which forms images on a copy substrate, means for exposing images of documents to said processor, transfer means for transferring the images of the documents from said processor to the copy substrate, and feed means for feeding the copy substrate to said processor, the improvement comprising:

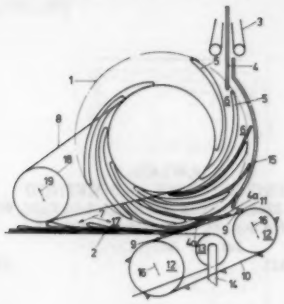
copy substrate trail edge registration means for transporting and registering the copy substrate in synchronism with an image produced by said processor, said copy substrate registration means including belt means for receiving the copy substrate from said feed means, said belt means comprises an enclosed loop of material with integral discrete fingers molded therein and spaced along the loop, said fingers extending vertically therefrom for capturing the trail edge of the copy substrate and registering the copy substrate while transporting it toward said processor, said transfer means comprises a corona generator which sprays ions onto the backside of copy substrate as they pass the generator, said ions electrostatically attaching the copy substrates to said processor causing said processor to pull the copy substrates away from said copy substrate registration means and transport the copy substrates for further processing.

4,487,408

UNIT FOR PARALLELIZING SHEET-LIKE PRODUCTS AT THE DELIVERY END OF A PRINTING PRESS

Rudolf Fischer, Ludwigshafen-Oggersheim, Fed. Rep. of Germany, assignor to Albert-Frankenthal AG, Frankenthal, Fed. Rep. of Germany

Filed May 20, 1982, Ser. No. 380,214
Claims priority, application Fed. Rep. of Germany, Jun. 12, 1981, 3123406
Int. Cl.³ B65H 9/10
U.S. Cl. 271—233 7 Claims



1. In a delivery unit designed for parallelizing leading edges of overlapped sheet-like products, moving in a line, having a fan wheel and a delivery belt positioned thereunder for taking up said products from said fan wheel as a chain of said products overlapped like scales in said parallelizing operation, the improvement comprising:

a driving system including a plurality of parallel endless driver belts running at constant speed each having a plurality of drivers equally spaced on the outer side thereof, said drivers being in the form of dogs;

said driving system moving said drivers at a higher speed than the trailing edge of each product last to have a leading edge thereof placed on said driving belt; and

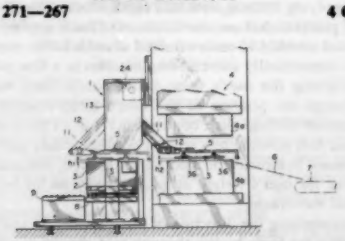
the driver belts of said driving system being placed so as to have an upwardly running slope, in a direction opposite to the direction of transport in relation to the delivery belt, so that where said drivers come up against said sheet-like products they move along a sloping line of motion in respect to the plane of transport of said delivery belt.

4,487,409

APPARATUS FOR AUTOMATIC FEEDING OF WORKPIECE

Masaru Orii, Machida, Japan, assignor to Kabushiki Kaisha Orii Jidoki Seisakusho, Japan

Filed Jul. 30, 1982, Ser. No. 403,358
Claims priority, application Japan, Oct. 27, 1981, 56-171864
Int. Cl.³ B65H 5/08
U.S. Cl. 271—267 4 Claims



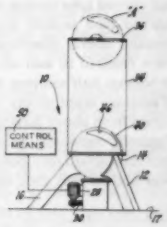
1. An automatic feeding apparatus including an arm for moving a workpiece between a feed position and a working position and having at one end a hand for holding the workpiece and which is pivotally mounted at the other end in a vertically movable manner, a swinging member that is swung by a swinging mechanism driven by a single motor and which is swung to move said other end of the arm vertically and a guide member that is shifted along a guide groove in conjunction with the swinging motion of said swinging member to control the movement of said one end of said arm, said guide groove consisting of a curved area that controls a horizontal movement of said one end of said arm and straight areas that control vertical movements of said one end of said arm at each extremity of said horizontal movement, the swinging action of said swinging member causing the hand to move horizontally between the feed position and the working position of the workpiece and to move vertically by a predetermined distance at each position.

4,487,410

FLUID SUSPENDED PASSENGER CARRYING SPHERICAL BODY HAVING UNIVERSAL ATTITUDE CONTROL

John J. Sassak, 36855 Schoolcraft, Livonia, Mich. 48150

Filed Sep. 30, 1982, Ser. No. 431,847
Int. Cl.³ A63J 5/12; G09B 9/08
U.S. Cl. 272—6 12 Claims



1. Apparatus comprising:

a base having a seat with an upper opening and a lower opening;

a spherical passenger-holding body having closure means for receiving a passenger therein, the body being receivable through the upper opening in the base to a lower position in the seat adjacent said lower opening;

means for delivering a fluid through the lower opening in the base beneath the body to raise it above said lower position such that the body is supported solely by the fluid being received through the lower opening in the base and passing out the upper opening; and

external control means and internal control means each having means adapted to be operated by the passenger to jointly control the universal attitude of the body when suspended in and by the fluid, the external control means biasing the body by reaction to the fluid and the internal control means biasing the body by imbalance.

4,487,411

PLAYGROUND TUBE SLIDE

Paul W. Ahrens, Grinnell, Iowa, assignor to Miracle Recreation Equipment Company, Grinnell, Iowa

Division of Ser. No. 183,049, Sep. 2, 1980,. This application Sep. 30, 1982, Ser. No. 431,211
Int. Cl.³ A63G 21/00
U.S. Cl. 272—56.5 R 2 Claims

1. A playground tube slide comprising,

an elevated deck,

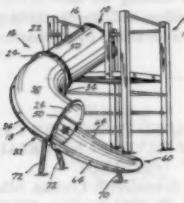
an elongated slide bed extending from said deck to the

ground, said slide bed including a plurality of tube sections connected together in end-to-end relation,

said tube sections including identical top and bottom half sections interconnected by fastening means engaging laterally outwardly extending flanges along the length of said top and bottom half sections,

each tube section further comprising laterally outwardly extending arcuate end flanges on the opposite ends of said top and bottom half sections,

at least one of said tube sections having a curved center axis, thereby providing a curved tube section,



the end flanges on one end of said curved tube section being connected to the end flanges on one end of another tube section so that said curved tube section turns in one lateral direction, said curved tube section being adapted to be turned in the opposite lateral direction by rotating said curved tube section relative to said another tube section with the top and bottom half sections becoming the bottom and top half sections respectively, and

a contoured apron open from above having protective handrail means and a laterally outwardly extending arcuate end flange on its upper end adjustably connected to the end flange of the lower end of said slide bed for safe exiting from said slide.

4,487,412

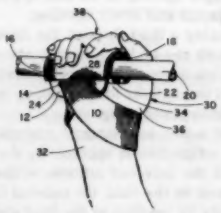
WEIGHT LIFTING GRIPS

Joseph J. Meeko, 524 Penn St., N. Catasauqua, Pa. 18032

Filed Jul. 11, 1983, Ser. No. 512,229

Int. Cl.³ A63B *11/00*

U.S. Cl. 272—123 **6 Claims**



1. A device for enhancing a user's grip on weight exercising equipment comprising:

(a) an inverted, generally U-shaped cradle with open ends, said cradle's sides having one outside edge extending beyond the outside edge of the opposite side and having a length generally equivalent to the width of the user's palm and a peripheral width generally equivalent to the length of the user's hand; and,

(b) an endless belt having a halved band configuration attached to said cradle proximate said extended side outside edge, said belt having a perimeter predetermined to encircle a user's wrist with sufficient slack only to allow the user to grasp said cradle's exterior surface when said user's hand is inserted in said belt,

whereby, in use, said cradle containing the bar of said exercise equipment is gripped by the user's hand so that said cradle opening rolls inward with said nonextended cradle side touching the user's palm and said belt braces and supports the user's wrist providing greatly increased lifting power to the user's hands while said cradle reduces strain on the user's hands.

4,487,413

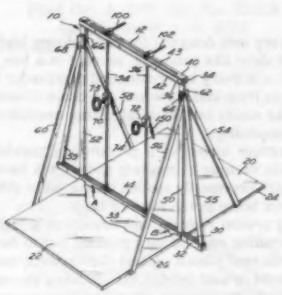
EXERCISE DEVICE AND METHOD

James R. Fall, 2205 W. Edna Dr., Santa Ana, Calif. 92706

Filed Sep. 28, 1982, Ser. No. 425,561

Int. Cl.³ A63B *23/00*

U.S. Cl. 272—125 **27 Claims**



1. An improved method of performing isometric exercises, said method comprising:

(a) adjusting the height of each of a pair of movable, vertically adjustable, exercise handles to one of plural positions within the reach of a user, said handles sized for grasping by the hands of the user;

(b) rigidly locking each of said handles in said one of plural positions, so that they are temporarily immovable and stationary;

(c) grasping one of said handles with one of the user's hands and the other of said handles with the other of user's hands;

(d) applying force against said rigidly locked handles in one of plural directions, the direction of force applied by each hand selected to tense selected muscles in the user's body to isometrically exercise said muscles in a first position;

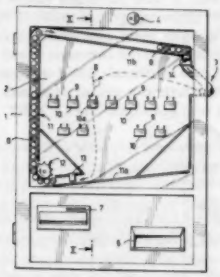
(e) moving the user's torso in a smooth, fluid motion to change the position of the user's torso relative to said handles throughout a continuous range of positions, from said first position to a second position, while said handles remain immovable in said rigidly locked, stationary position, the user's weight at least partially on his feet during said movement;

(f) maintaining the direction of force applied to said handles while the torso moves through said change in position to maintain tension on said selected muscles and continuously exercise said muscles throughout said continuous range of positions.

4,487,414
COIN OPERATED PRIZE DISPENSING PROJECTING GAME

Martti Kärkkäinen, Espoo, and Lauri Martti, Helsinki, both of Finland, assignors to Raha-Automaattiyhdistys, Helsinki, Finland

PCT No. PCT/FI82/00018, § 371 Date Jan. 7, 1983, § 102(e) Date Jan. 7, 1983, PCT Pub. No. WO82/04340, PCT Pub. Date Dec. 9, 1982
PCT Filed May 26, 1982, Ser. No. 459,609
Claims priority, application Finland, Jun. 1, 1981, 811687
Int. Cl.³ A63F 9/02; G07F 17/38
U.S. Cl. 273—371 4 Claims



1. A slot machine comprising a plurality of first coin means of predetermined fixed number, a vertical gambling panel defining a first planar closed path for circulating said plurality of first coin means therein, said first planar closed path including hitting means for hitting one of said first coin means, and a plurality of prize sensors for intercepting said one of said first coin means hit by the hitting means; second coin means different from said first coin means, coin receiving means for receiving said second coin means for commencing operation of the slot machine on receiving predetermined amounts of said second coin means, and a second path different from said first path and being from said coin receiving means directly to a pay-out mechanism operatively connected to a prize trough and a cash box as a function of interception or not of the first coin means by the prize sensors, said plurality of first coin means only being circulated in said first planar closed path for supply at least one at a time to said hitting means in said first path as a function of deposit of said second coin means in said coin receiving means, said prize sensors being connected to said pay-out mechanism and providing an impulse to said pay-out mechanism when one of said first coin means is received by one of the prize sensors, said pay-out mechanism paying out said second coin means through said prize trough on receipt of said impulse or releasing the second coin means to said cash box in the absence of said impulse.

4,487,415
BEAD TRANSFERRING PUZZLE

Jay F. Wilfong, Rte. 1, Box 387, Newton, N.C. 28658

Filed Jun. 8, 1983, Ser. No. 502,221
Int. Cl.³ A63F 9/08
U.S. Cl. 273—113 4 Claims

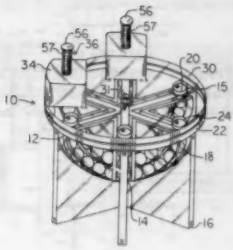
1. A puzzle apparatus comprising:

(a) a base member including a plurality of continuous, open ended, curved tubular channels intersecting at a common point substantially intermediate the distal ends thereof, each of said channels extending from said intermediate point along an arcuate path to said open, distal end which terminate in a common horizontal plane;

(b) each of said channels containing a plurality of spherical beads having a diameter slightly less than that of said channel such that said beads are freely movable within said channel and introduced thereinto at one of said open distal ends; means for characterizing said beads and differentiating them into a plurality of groups, each of said groups of said beads being contained in a selected one of said channels;

(c) a flat cover plate fixedly and nonrotatably mounted horizontally over said distal end openings of said channels; said cover plate including a plurality of apertures equal in number to, and aligned with, said distal end openings of said channels;

(d) a cap member concentric to and rotatably mounted on said cover plate; said cap having a hole pattern therein comprising at least two spaced holes therethrough, said



holes pattern being such that when the cap is rotated, only one of said holes can be moved into alignment with a prescribed one of said channel openings at any given move; and

(e) a trap comprising a pocket extending upwardly from each of said holes for receiving and retaining a selected one of said beads therein;

whereby the puzzle is solved by manually tilting the puzzle to roll a selected one of said beads into one of said traps and rotating said cap to transfer the bead which is captured in the trap to another one of said channels, and continuing to make such transfers until all of said beads have been reorganized according to a prescribed pattern or orientation.

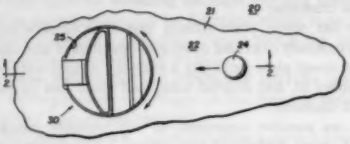
4,487,416
ROTATABLE KICKER FOR PINBALL GAME

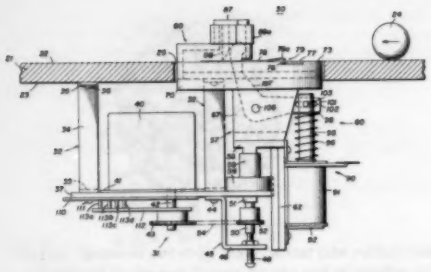
Albin Peters, Chicago, Ill., assignor to Wico Corporation, Niles, Ill.

Filed Aug. 19, 1982, Ser. No. 409,414
Int. Cl.³ A63F 7/00
U.S. Cl. 273—129 V 19 Claims

1. A rotatable kicker apparatus for a pinball game including a playfield board on which a pinball rolls, said kicker apparatus comprising a frame supported by the playfield board and rotatable with respect thereto about an axis disposed substantially perpendicular thereto, a kicker member carried by said frame for reciprocating kicking movement along a straight linear path substantially parallel to the playfield board to engage the associated pinball and propel it along the playfield board in a predetermined direction relative to said frame, kicker drive means carried by said frame and coupled to said kicker mem-

ber for effecting kicking movement thereof, and frame drive means coupled to said frame for effecting rotational movement





thereof about said axis thereby to vary said predetermined direction.

4,487,417

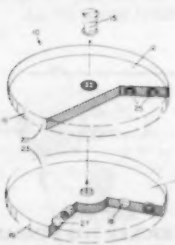
PUZZLE AMUSEMENT DEVICE

Douglas A. Engel, 2935 W. Chenango, Englewood, Colo. 80110

Filed Sep. 28, 1982, Ser. No. 425,224

Int. Cl.³ A63F 7/04

U.S. Cl. 273—115 **2 Claims**



1. An amusement device comprising in combination:

a pair of storage elements rotatable relative to each other in face-to-face relationship, each storage element having at least one hemispherically-shaped hole defining a storage cavity, which storage cavities are in overlapping alignment between the storage elements; and

means for transferring a plurality of pieces between storage cavities of one of said storage elements to storage cavities of the other of said storage elements by selective rotation of said storage elements to align said overlapping storage cavities permitting transferral of said pieces from one to the other of said storage cavities, the receipt of any one spherical piece precluding the transfer of any additional spherical pieces.

4,487,418

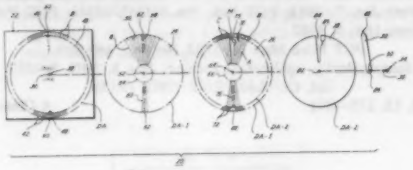
EDUCATIONAL GAME DEVICE

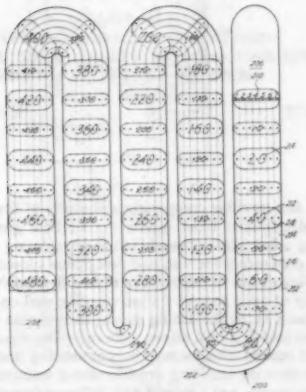
Earl E. Allen, Sr., 7683 Cambridge, Houston, Tex. 77054

Filed Apr. 30, 1984, Ser. No. 605,481

Int. Cl.³ A63F 3/00, 9/18; G09B 3/02

U.S. Cl. 273—242 **23 Claims**





1. An educational apparatus comprising:

a base having a border with a plurality of question numbers therearound;

a question disc sized for mounting within said border on said base, said question disc being divided radially into a plurality of question segments, each of said question segments having a question printed therein, said questions being uniquely numbered by said question numbers;

an answer disc rotatably mounted on said base over said question disc and sized to cover said questions, said answer disc having a plurality of answer numbers around its periphery and being further divided radially into a plurality of answer segments, each of said answer segments having an answer printed thereon to one of said questions, said answers being uniquely numbered by said answer numbers to correspond to said numbered questions, said answer disc having a first window for viewing a selected one of said questions through said answer disc;

a cover disc rotatably mounted on said base over said answer disc and sized to cover said answers, said cover disc having a second window for alignment with said first window to view said selected question and for alignment with said answer number on said answer disc to view the numbered answer to said selected question;

means for securing said discs to said base; and

means for fixing said question disc with respect to said base to provide proper alignment between said question numbers and questions.

8. The apparatus of claim **1** further including a scoring device to keep track of the questions answered correctly, said device including:

a track having a plurality of lanes;

said track having a start position and a finish position;

said track having scoring positions marked with numbers, said numbers identifying the number of points accumulated by answering a question correctly.

19. An educational apparatus comprising:

a base having a circular border thereon which is sectioned radially into ninety-eight equally sized question blocks each having an inner edge and an outer edge, said circular border having two bonus blocks in 180° opposition being marked with the word "BONUS" and separating said circular border into two halves, said question blocks marked with numbers **1–49** forming one-half of said circular border and said question blocks marked with numbers **50–98** forming said other half of said circular border between said bonus segments, one of said bonus segments being a start position having the word "START" written inward radially from said inner edge of said bonus segment, said bonus segments having variant colors and each alternate question block therefrom also having such variant colors, said base having a central aperture and having the words "DISC ONE" displayed near said central aperture;

a question/answer disc sized for mounting within said circular border on said base, said question/answer disc having an outer edge and a central aperture with a subcircle inscribed around said central aperture and the words "DISC TWO" displayed within said subcircle, said question/answer disc being divided radially on both sides into one hundred equally sized question/answer segments, said question/answer disc having a start segment displaying the word "START" written inward radially from said outer edge of said question/answer disc and having a side segment in 180° opposition to said start segment displaying the words written inward radially from said outer edge of said question/answer disc designating a certain side of said question/answer disc, said radial question/answer segments having an inner end and an outer end, said outer end having the same width as said inner edge of one of said question blocks in said circular border on said base, said question/answer segments being divided into two equal subsegments, one subsegment being a question subsegment and one being an answer subsegment, said question subsegment displaying a single question written inward radially from said outer edge of said question/answer disc and said answer subsegment displaying an answer corresponding to said question written inward radially from said outer edge;

a cover disc rotatably mounted on said base over said question/answer disc to cover said questions and answers, said cover disc having a central aperture and having a window the size of a single question/answer subsegment on said question/answer disc, said window extending to a distance from said central aperture equal to the radius of said subcircle on said question/answer disc;

a pointer rotatably mounted on said cover disc having a rounded end and a pointed end, having an aperture through said rounded end, said pointer having a radial length equal to the radius of said question/answer disc;

means for securing said discs and pointer to said base comprising a post screw passing through common apertures in said base and discs, said post screw having a nut and bolt, said bolt having a threaded pin and a larger diameter head, said nut having a cylinder and a larger diameter head, said cylinder being threaded at its interior to engage said threads of said pin, said larger diameter heads securing said base, question/answer disc and pointer therebetween; and

means for fixing said question/answer disc with respect to said base comprising at least one projection on said base engaging at least one notch in said question/answer disc.

20. A method of playing an educational game, said game including a rotatable pointer, a question/answer disc with a circular border of question blocks displaying numbers which surround and number questions and their corresponding answers, said questions and answers displayed radially in radial segments on the circular question/answer disc, a cover disc covering said question/answer disc and having a window therethrough to view said questions and answers, comprising the steps of:

a. selecting a question number by spinning the pointer;

b. moving the window in the cover disc adjacent to the left half of the question/answer block displaying the number selected;

c. viewing the question through the window;

d. attempting an answer to the revealed question;

e. moving the window in the cover disc adjacent to the right half of the question block displaying the number selected; and

f. viewing the correct answer through the window and comparing said revealed answer to said attempted answer.

4,487,419

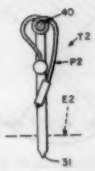
PROJECTILE GAME APPARATUS

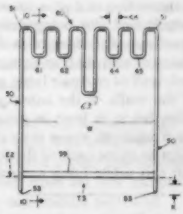
Dale K. Welbourn, 310 Bardsley St., Neola, Iowa 51559

Filed Nov. 23, 1983, Ser. No. 554,542

Int. Cl.[3] **A63B** *67/00, 65/00*

U.S. Cl. 273—343 **9 Claims**





1. Projectile game apparatus for playing along a horizontal play-field and comprising: a hurlable bola-type projectile, a plurality of targets therefor respectively extending uprightly from the play-field, and a plural targets courseway wherein the targets are specially arranged to be serially consecutively engaged by the bola-type projectile according to a predetermined game plan,

A. said bola-type projectile comprising a pair of weights including a volumetrically larger head-weight and a smaller tail-weight respectively tethered to an elongate flexible connector cord whereby there exists a finite elongate-length between said weights;

B. each of said targets including:

i. a pair of substantially parallel upright standards having a finite transverse-length therebetween, each standard having a lower-end stationable at the play-field, and

ii. a transversely extending and generally horizontal undulated cross-bar connecting upper portions of said standards, said undulated cross-bar having a finite height-elevation above the standards at the play-field, said height-elevation exceeding about one-half said cord elongate-length; and

C. said plural targets courseway extending longitudinally lengthwise along a longitudinal-axis lying along said hori-

zontal play-field and comprising at least four targets, said courseway being defined in a lengthwise extent of at least ten feet by two said targets characterized as primary-targets having their cross-bars transversely intersecting the vertical plane of said longitudinal-axis, said courseway further including at least two additional targets characterized as secondary-targets divided in membership along opposite lateral sides of said longitudinal-axis vertical plane and thereat longitudinally offset from said two primary-targets.

4,487,420

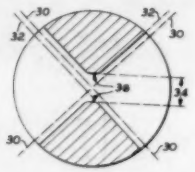
DARTS

Martin G. Ollis, Butler's Leap, Clifton Road Industrial Estate, and John E. Hart, 10 Barton Rd., both of Rugby, Warwickshire, England

Continuation-in-part of Ser. No. 128,911, Mar. 10, 1980, abandoned. This application Jul. 13, 1982, Ser. No. 397,823

Int. Cl.³ A63B *65/02*

U.S. Cl. 273—423 **7 Claims**



1. A dart comprising a flight having four vanes connected along a central axis and a one-piece dart shaft having a slot extending generally diametrically through its thickness and terminating short of both ends of the shaft, the slot being of minimum traverse dimension in a plane containing the longitudinal axis of the shaft, said slot being defined by four walls, each pair of walls on opposite sides of such plane comprising generally flat surfaces of said shaft at generally right angles to each other, and each wall of one pair lying generally parallel to a different one of the walls of the other pair, said minimum transverse dimension being at least as great as the combined thickness of any two adjacent vanes such that said flight may be inserted in the slot to cause each of the four vanes to extend radially of the shaft axis while lying against a wall of the slot.

4,487,421

PIPE GASKET WITH REINFORCING MEANS IN ITS BASE SELF-ENERGIZING

Jim Housas, Stow, and Anthony J. Reto, Kent, both of Ohio, assignors to Hamilton Kent Manufacturing Company, Inc., Kent, Ohio

Filed May 10, 1983, Ser. No. 493,321

Int. Cl.³ F16J *15/32*

U.S. Cl. 277—207 A **28 Claims**

1. A gasket comprising a compressible base adapted to be received by one of a pair of telescoping pipes, an arm connected with and extending from said base and terminating in a sealing lip which curves away from said base and is adapted to engage the other of the pipes, said base having a surface adapted to engage said arm between said connection with said base and said lip upon telescoping of the pipes together to press said lip against the other of said pipes and reinforcing means in said base to reduce the compressibility of said base in the area of said surface.

4,487,422

VEHICLE SPLASH APRON

Pekka J. Turunen, Sähköttäjänk. 2 F 71, 00520 Helsinki, Finland

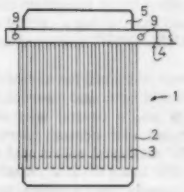
PCT No. PCT/FI81/00088, § 371 Date Jul. 30, 1982, § 102(e) Date Jul. 30, 1982, PCT Pub. No. WO82/01857, PCT Pub. Date Jun. 10, 1982

PCT Filed Dec. 1, 1981, Ser. No. 403,656

Claims priority, application Finland, Dec. 1, 1980, 803719

Int. Cl.³ B62D *25/18*

U.S. Cl. 280—154.5 R **6 Claims**



1. A vehicle splash apron which is adapted to be connected behind a vehicle tire in a driving direction of the vehicle comprising:

a plurality of substantially vertically elongated flap strips; and means for supporting the upper portion of said flap strips in a depending side-by-side relationship with abutting side edges;

wherein every other one of said flap strips in said side-by-side relationship forming a first group of flap strips, the remainder of said flap strips forming a second group of flap strips, and means for rendering said first group of flap strips more easily movable by a draft due to the motion of a vehicle to which said flap strips are connected than said second group of flap strips to cause the formation of gaps between said first and second groups of flap strips.

4,487,423

BICYCLE FRAME

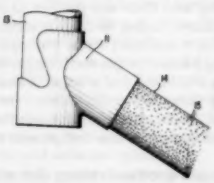
Dieter Kleinebenne, Dornberger Strasse 225, and Fred Kleinebenne, Dornberger Strasse 213, both of D-4800 Bielfeld 1, Fed. Rep. of Germany

Filed Jun. 4, 1982, Ser. No. 385,284

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1981, 8117517[U]

Int. Cl.³ B62K *11/02, 3/04, 19/12*

U.S. Cl. 280—279 **12 Claims**



1. A bicycle frame comprising a plurality of tubes made of a light metal, at least one sleeve coupling connecting two of these tubes together, a separate pipe socket made of steel fastened within said sleeve coupling so as to project therefrom, with one of said two tubes being fitted around said pipe socket to contact the exterior surface of said pipe socket, and a layer

of a metal adhesive disposed between, and connecting together, the interior surface of the said tube and the exterior surface of said pipe socket, the wherein said exterior surface of said pipe socket is mechanically roughened by means of sand blasting to have a fine-grained surface.

4,487,424

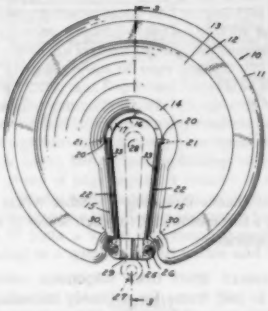
BICYCLE SPROCKET SHIELD

William L. Ellis, 21030 Reserve Dr., Fairview Park, Ohio 44126

Filed Jan. 21, 1983, Ser. No. 459,716

Int. Cl.³ B62K *13/00*

U.S. Cl. 280—289 G **15 Claims**



1. Bicycle sprocket shield comprising annular disc having radial pedal crank clearance slot extending from central opening, mounting flange means around said opening, pedal crank arm engaging clamp means, and means extending from said clamp means for holding said disc in coaxial shield relation to a bicycle sprocket assembly.

4,487,425

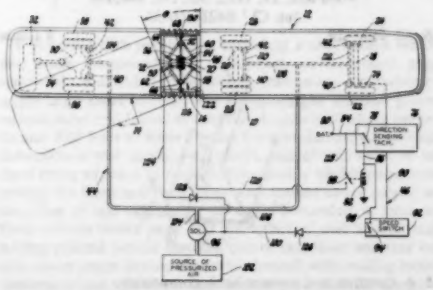
BRAKE CONTROL SYSTEM FOR AN ARTICULATED VEHICLE

David J. Taylor, Pontiac, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 6, 1982, Ser. No. 447,314

Int. Cl.³ B62D *53/00*

U.S. Cl. 280—432 **3 Claims**



1. In an articulated vehicle having a front section and a rear section interconnected by a hinge connection which allows relative angular displacement of said front and rear sections about a vertical axis, one of said sections having a pair of axles and the other of said sections being provided with a single axle, each of said axles having wheels at the opposite ends thereof provided with brake means, fluid-operated actuator means carried by each axle for causing said brake means to be applied to brake the associated wheels and stop the vehicle when supplied with pressurized fluid, a source of pressurized fluid, a normally-closed valve located between said source of pressurized fluid and said fluid-operated actuator means of at least one of said axles, a control circuit including direction sensing means and speed responsive means for causing said valve to open and connect said source of pressurized fluid to said fluid-operated actuator means when said vehicle is moving in reverse and attains a predetermined speed, and means operatively associated with said direction sensing means and located at said hinge connection for causing said valve to open when the vehicle is moving in reverse and said rear section is angularly displaced relative to the front section at a predetermined angle.

4,487,426

SKI

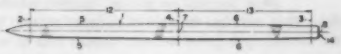
Akitoshi Nishizawa, Nagano, Japan, assignor to Kabushikigaisha Nishizawa, Tokyo, Japan

Filed May 17, 1982, Ser. No. 378,992

Claims priority, application Japan, Jun. 8, 1981, 56-84559[U]; Mar. 3, 1982, 57-30106[U]; Mar. 18, 1982, 57-37234[U]

Int. Cl.³ A63C *5/04*

U.S. Cl. 280—609 **12 Claims**



1. A ski having an overall length of 1790 mm to 2130 mm, comprising:

a front ski half extending from a front tip portion to a middle part, said front ski half including a shovel portion and a front ground line defined at the transition between said shovel portion and the remainder of the ski, said front ground line having a width of 66 mm to 67.2 mm, and said middle part having a width of 69 mm to 70.2 mm;

a rear ski half extending from the middle part to a tail portion and including a rear ground line defined at the transition between said tail portion and the remainder of the ski;

a gliding surface; and

a boot-binding part,

wherein said front ski half includes right and left side contours formed in plan into outwardly-bulging curves relative to a longitudinal center line of said ski, and wherein the width of said front ski half increases from said front ground line to said middle part; and

wherein said ski comprises one of a pair of similar skis adapted to be attached to opposite feet of a skier.

4,487,427

SYSTEM FOR BINDING A BOOT TO A SKI

Georges P. J. Salomon, Annecy, France, assignor to S.A. Etablissements Francois Salomon & Fils, Annecy, France

Continuation of Ser. No. 63,556, Aug. 3, 1979, abandoned. This application Sep. 10, 1981, Ser. No. 300,787

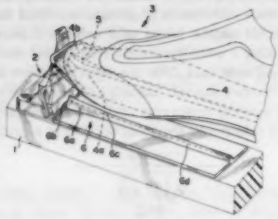
Claims priority, application France, Dec. 11, 1978, 7835488; Mar. 3, 1979, 7907071

Int. Cl.³ A63C *9/20*

U.S. Cl. 280—615 **3 Claims**

1. A system for binding a boot to a ski intended for the practice of cross-country skiing, comprising connecting means located at the forward end of the front of the boot pole only, assuring retention of the front of the boot on the ski and allowing the heel of said boot to lift with respect to the top surface of the ski, and means for laterally retaining the boot on the ski extending substantially longitudinally with respect to said boot, at least in the zone located beneath the front of the boot, a first part of said lateral retention means comprising at least one recess located under and forming a portion of the sole of said boot, while a second part of said lateral retention means comprises at least one projection mounted on the top surface of said ski, said first and second parts having complementary

cross sections of substantially inverted V shape decreasing in size from front to rear, assuring their cooperation during ski-



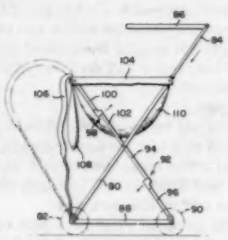
ing, and extending along a longitudinal axis parallel to that of said ski.

4,487,428

CONVERTIBLE STROLLER

Steve N. Harada, and Kathleen L. Harada, both of P.O. Box 798, Coupeville, Wash. 98239

Filed Sep. 30, 1982, Ser. No. 429,253
Int. Cl.³ B62B 7/12
U.S. Cl. 280—648 **6 Claims**



1. A device, for use in transporting a small child, which may be conveniently carried on the back or rolled on the ground and further may be completely collapsed for transport or storage, said device comprising:

a rigid rectangular main frame member extending from a position at the lower portion of the device to position at the upper portion of the device and forming a handle;

at least two set of independently collapsible auxiliary frame members movable from a first position adjacent the main frame member to a second position extending outwardly therefrom;

pivotable rectangular third frame members, each secured to the main frame member and one set of the independently collapsible auxiliary frame members such that they formed rigid triangular elements having adjacent vertices when viewed from a position to the side of the device, when said auxiliary frame member is in the second position,

a set of wheels at the lower end of the rigid main frame and at the lower end of one set of collapsible auxiliary frame members, and

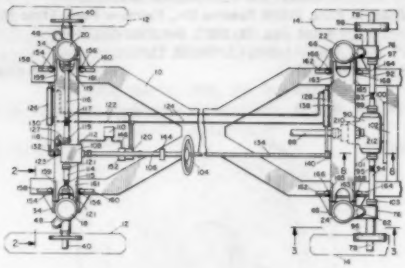
a baby supporting seat secured to and enclosed by one of said third rectangular frame members.

4,487,429

TILTING WHEEL VEHICLE SUSPENSION SYSTEM

Thomas P. Ruggles, 1417 Country Club Dr., Escondido, Calif. 92025

Filed Sep. 30, 1982, Ser. No. 428,548
Int. Cl.³ B62D 9/02
U.S. Cl. 280—772 **20 Claims**



1. A vehicle chassis including a tiltable wheel suspension system having a suspension unit for each wheel of said chassis, said system comprising:

a frame,

a pair of spaced apart front suspension units pivotally mounted to said frame for rotatably mounting a pair of front wheels on said frame for tilting about a horizontal axis below the rotary axis of said wheels and parallel to the plane of said wheels,

a pair of rear suspension units pivotally mounted to said frame for rotatably mounting a pair of rear wheels for tilting about a horizontal axis below the rotary axis of said wheels and parallel to the plane of said wheel, wherein said suspension units maintains said chassis substantially level during tilting of said wheels,

steering means mounted on said frame for steering one of said pair of front and rear wheels, and

tilting control means for coordinated tilting of said wheels in the direction of turning of the wheels of said vehicle.

4,487,430

FOLD AND HOLD ANSWER BOOK

Sarah A. Bernardin, 1518 Brooklyn, Ann Arbor, Mich. 48104

Filed Jan. 29, 1982, Ser. No. 344,026
Int. Cl.³ B42D 21/02
U.S. Cl. 281—29 **1 Claim**

1. A question and answer book comprising:

a front cover,

a back cover,

binding means connecting spaced parallel edges of said front and back covers for relative folding movement about a first fold axis,

a plurality of individual book page segments interposed between said front and back covers and each secured along one edge thereof to said binding means for relative folding movement about said first fold axis,

said book page segments consisting of a first group of segments having tabs thereon and a second group of segments without tabs thereon,

said tab on each of said first group of page segments extending a predetermined lateral distance from the edges of said page segment opposite said edge thereof secured to said binding means,

a flap hingedly attached to the edge of one of said book covers opposite the edge thereof connected to said binding means,

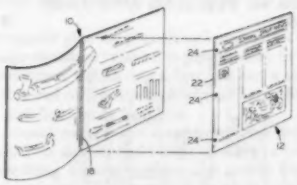
said flap being foldable about a second fold axis arranged parallel to said first fold axis and spaced laterally therefrom a distance greater than the sum of the dimensions of the lateral width of said page segments plus said predetermined lateral distance,

said flap being foldable along said second fold axis between a first position generally coplanar with said one book cover so as to not restrain folding movement of either said first or second groups of page segments relative to said one book cover; said flap being foldable to a second position arranged generally parallel to said one book cover so as to overlie said tabs and thereby restrain said first group of page segments from folding movement relative to said one book cover, but permitting folding movement of said second group of page segments relative to said one book cover, whereby said second group of page segments restrained by moving said flap to said second position cooperating to form a visual impression forming an answer responding to a question posed within said book.

4,487,431
PUBLICATION CONVERTIBLE TO POSTER AND REMOVABLE INSERT AND METHOD OF MAKING SAME

John M. Kelly, Bloomfield, Conn., assignor to The Stanley Works, New Britain, Conn.

Filed Jul. 13, 1981, Ser. No. 282,751
Int. Cl.³ B42D *15/00*
U.S. Cl. 283—1 R **6 Claims**

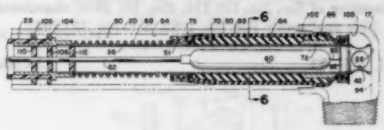


1. A convertible publication including a cover and a removable insert comprised of a multiplicity of integrated pages removably assembled therewithin, said cover comprising a single large sheet of relatively heavy-weight material printed on both sides and folded at least twice upon itself along perpendicular fold lines to form at least four substantially identically dimensioned and configured panels, one of said sides of said sheet being exposed to provide four readily-visible pages comprising the front and rear inside and outside cover pages, and the other of said sides being normally concealed, at least said front outside cover page and one other of said visible pages having printed indicia thereon, one of said front and rear outside cover pages having a portion thereof with mailing indicia thereon so that said cover functions as the mailer for the publication, and the surfaces of said four panels on said normally concealed side of said sheet having indicia printed thereon cooperatively providing an integrated poster representation comprised of all four panels thereof, to provide a poster when said sheet is unfolded, the pages of said insert being of substantially the same configuration as said panels and of dimensions approximating but not exceeding those of said panels, said insert pages being attached to one another in pairs or greater numbers along their edge margins disposed at the fold line between said front and rear cover pages, and said insert being removably disposed between said inside cover pages and enveloped by said cover.

4,487,432
NO-HOLE INSERTION JOINT

David P. Passerell, Geneva, and Frank R. Volgstadt, Madison, both of Ohio, assignors to Perfection Corporation, Madison, Ohio

Filed Oct. 19, 1981, Ser. No. 312,703
Int. Cl.³ F16L *9/14*
U.S. Cl. 285—15 **22 Claims**



1. A joint for interconnecting two tubular conduits one of which is at least partially disposed within the other, said joint comprising in combination:

a first tubular conduit having an internal wall;

a second tubular conduit having an external wall, at least a portion of said second conduit being disposed within said first conduit; and

sealing and joining means positioned between said first conduit internal wall and said second conduit external wall for permanently sealing and joining said two conduits to each other, said sealing and joining means comprising:

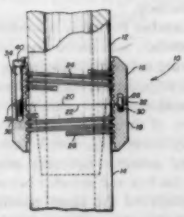
an elastomeric gasket surrounding said second conduit in a fluid tight manner, said gasket being in sealing contact with the internal wall of said first tubular conduit; and,

a low melting point alloy sleeve which is positioned between said gasket and said outer surface of said second conduit, said sleeve having been permanently deformed to urge said gasket into sealing contact with said internal wall of said first tubular conduit.

4,487,433
ANTI-ROTATION COUPLING

Henry W. Miller, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 16, 1982, Ser. No. 369,328
Int. Cl.³ F16L *15/00*
U.S. Cl. 285—81 **9 Claims**



1. A system for providing an anti-rotational coupling joint comprising:

a first pipe having an end with a first set and a second set of external threads; said second set of threads wound in a predetermined direction at a predetermined pitch;

a second pipe having an end with an internal set of threads and an external set of threads, said external set wound in the opposite of said predetermined direction at said predetermined pitch and said internal set of threads for receiving said first set of external threads;

a coupling having a first half and a second half having threads in threaded engagement with said second set of threads on said first pipe and said external set of threads on said second pipe; and

means for preventing rotation of said first half with respect to said second half.

4,487,434

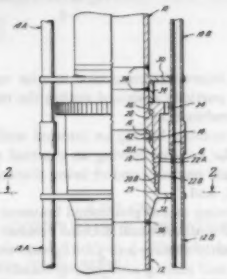
UNION-TYPE COUPLING FOR MARINE DRILLING RISER PIPE

Joseph R. Roche, Houston, Tex., assignor to Hydril Company, Los Angeles, Calif.

Continuation of Ser. No. 105,136, Dec. 19, 1979, abandoned. This application Feb. 26, 1982, Ser. No. 352,588

Int. Cl.[3] **F16L** *35/00*

U.S. Cl. 285—93 **13 Claims**



1. A coupling adapted for releasably securing first and second riser pipe sections in an aligned operating relationship for forming an internal fluid path comprising:

a box end member connected to the end of the second riser pipe section, said box end member having a torus member formed about the periphery of the end of the box end member, said torus having an upwardly facing shoulder and a downwardly facing shoulder means,

a pin end member connected to the end of the first riser pipe section, the upper end of the pin member having an upper end means shaped to engage the downwardly facing shoulder means of the torus member of the box end member, the pin end member having an outer surface adjacent its end having a first set of helical threads formed thereon extending continuously about the periphery of said pin end outer surface,

a union box member rotatably mounted coaxially about said box end member, said union box member having a head portion having a downwardly facing shoulder and having a second set of helical threads formed on an inner annular surface of said union box member,

said second set of threads of said union box member being continuously interengaged with said first set of threads of said pin end member operably compressing said torus member of the box end member between the downwardly facing shoulder of the head portion of the union box member and the upper end means of the pin member, said upwardly facing shoulder of the torus member operably engaging said downwardly facing shoulder of the head portion of the union box member and said downwardly facing shoulder means of the torus operably engaging the upper end means of the pin member, the interengaging of the first and second threads and the resulting compressing of said torus member operably preloading said coupling and placing said end of the pin end member and said torque member of said box end member in compression while said union box end member is in tension,

sealing means for providing a fluid tight seal between the coupled tubular riser pipe sections to prevent leakage therebetween from the flow path of fluid under pressure,

the pin end member having an upwardly facing lower annular shoulder disposed beneath said first set of helical threads on the outer surface of said pin end member,

the union box member having a lower annular end beneath said second set of helical threads on the inner surface of said union box member, the distance between said lower annular shoulder and said upper end means of the pin member and the distance between the lower annular end of said union box member and the downwardly facing shoulder of said head portion of said union box and the distance between upwardly and downwardly facing shoulders of said torus member being cooperatively provided so that said lower annular end of said union box member engages said lower annular shoulder of said pin end member when said coupling is properly preloaded, the engagement of said lower annular shoulder of said pin end member and said lower annular end of said union box providing a visual indication of proper riser coupling preload.

4,487,435

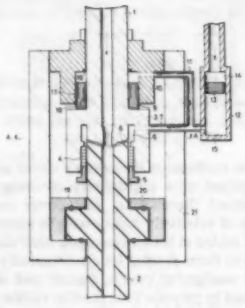
SWIVEL JOINT

Yoshiichi Yamatani, 1870, Manazuru-machi, Ashigarashimogun, Kanagawa-ken, Japan

Filed Feb. 18, 1982, Ser. No. 350,109

Int. Cl.[3] **F16L** *21/00, 17/00, 27/00*

U.S. Cl. 285—94 **4 Claims**



1. A swivel joint which leads high-pressure liquid in a fixed pipe into a rotatable pipe coupled slidably to the fixed pipe, comprising a sliding area being surrounded by a lubricating chamber which is provided between the inside of a flange fixed to the fixed pipe and the rotatable pipe and a line connecting between the lubricating chamber and a source of lubricant having at least the same pressure as that of the high-pressure liquid in the fixed pipe, oil grooves being provided on the surface of the fixed pipe which is slidable relative to the rotatable pipe and being connected to the lubricating chamber, and a piston being provided for pressing against the flange so as to maintain the position of the fixed pipe and a line connected to supply lubricant to the piston.

4,487,436
CARDAN-TYPE PIPE JOINT WITH COMPENSATION FOR LONGITUDINAL EXPANSION

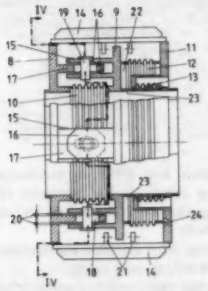
Otakar Mares, Baden, and Urs Ritter, Stüssalingen, both of Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Feb. 8, 1982, Ser. No. 346,936

Claims priority, application Switzerland, Feb. 17, 1981, 1022/81

Int. Cl.³ F16L *51/02*

U.S. Cl. 285—228 **9 Claims**



7. A cardan-type pipe joint with compensation for longitudinal expansion of two main pipe sections to be connected within a piping run, comprising:

the pipe joint having a longitudinal axis;

the pipe joint having a peripheral direction;

the two main pipe sections to be joined having a longitudinal direction;

a first pipe section and a second pipe section for attachment to said two main pipe sections;

a first flange member provided for said first pipe section;

a second flange member provided for said second pipe section;

a corrugated pipe for permitting longitudinal motion of said flange members relative to one another by means of bellows action and having a first end and a second end;

said first end of said corrugated pipe being fixedly attached to said first flange member;

said second end of said corrugated pipe being fixedly attached to said second flange member; a cardan joint for permitting angular motions and axially longitudinal motions of said first flange member and said second flange member relative to one another and having two pairs of bolts;

said two pairs of bolts being arranged substantially in a plane extending perpendicular to said longitudinal axis of the pipe joint and being spaced at substantially 90° from one another in said peripheral direction of the pipe joint;

said first flange member being provided with a pair of fork links and a pair of single links;

said second flange member being provided with a pair of single links and a pair of fork links;

each bolt of said two pairs of bolts being journaled in a respective one of said fork links as well as in a respective one of said single links engaging said respective one of said fork links;

said two pairs of bolts being journaled to be translatable in said longitudinal direction of the two main pipe sections to be joined;

each bolt of said two pairs of bolts having a bolt axis;

said first and second flange members having a central axis;

said single links being provided with elongated slots having major axes extending in a direction substantially parallel to said central axis of said first and second flange member;

each bolt of said two pairs of bolts being journaled in said fork links substantially free of play in a direction substantially perpendicular to said bolt axis;

each bolt of said two pairs of bolts being translatably journaled in said elongated slots in said single links; and

said single links engaging in said fork links with appreciable play in a direction extending substantially parallel to said bolt axes.

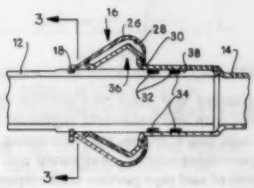
4,487,437
THREADLESS CONNECTOR

Gene D. Dickirson, Garden City, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 23, 1981, Ser. No. 333,843

Int. Cl.³ F16L *21/02*

U.S. Cl. 285—319 **12 Claims**



1. A coupling for connecting first and second members comprising:

spring means mounted on the first member and fixed against axial displacement relative to the first member having at least one leg with a free end adapted to move resiliently away from and toward the outer surface of the first member, said leg defining a space between said leg and the first member; and

latch means fixed to the second member having a first inclined surface contacted by said leg as the latch means is inserted within the spring means space and on which said leg is moved away from the first member, a second inclined planar surface and located axially adjacent and intersecting the first surface whose length extends substantially away from said intersection, contacted by said leg as the latch means is inserted further within the spring means and on which said leg moves toward the first member, and a locking surface located axially adjacent the second surface providing a surface over which the spring means latches after the latch means is inserted yet further within the spring means, whereby disconnection of the spring means and latch means is prevented due to contact of said leg with said locking surface.

4,487,438
FLEXIBLE FLANGE JOINT COUPLER

William T. Sweeney, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Feb. 12, 1981, Ser. No. 233,802

Int. Cl.³ F16L *17/06*

U.S. Cl. 285—349 **10 Claims**

1. A flexible pipe joint coupler for attaching a rigid pipe to an attachment means, said flexible pipe joint coupler including an attachment means having a plurality of spaced openings therethrough:

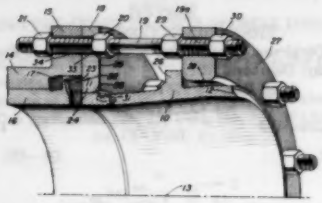
(a) a rigid pipe portion having a first and second end;

(b) an alignment ring means having an inner diameter and a plurality of spaced openings through said ring in axial alignment with said plurality of spaced openings through said attachment means for securing said alignment ring means to said attachment means and wherein the inner diameter of said alignment ring is dimensioned to receive and support the first end of said rigid pipe portion;

(c) yieldable gasket means mounted against a portion of said

alignment ring and inside said attachment means in a manner to sealably engage said first end of said rigid pipe portion; and

(d) restraining means including bolt means attached to said pipe portion and spaced from said first end, said bolt means passing through said attachment means openings, said alignment ring openings and to said restraining means



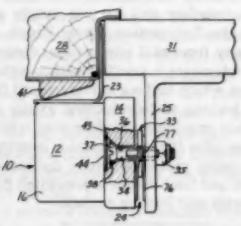
for positioning said rigid pipe portion first end in axial alignment with and inside said alignment ring and biased against said gasket means, said restraining means and bolt means permitting vertical, horizontal and axial rotational movement of said pipe portion with respect to said attachment means without resulting in leakage of said pipe portion between said first end and said attachment means.

4,487,439

MAGNETIC SHEAR LOCKING METHODS AND APPARATUS

William C. McFadden, La Canada, Calif., assignor to Dynametric, Inc., Pasadena, Calif.

Filed Oct. 27, 1981, Ser. No. 315,686
Int. Cl.³ E05C *17/56*
U.S. Cl. 292—251.5 **61 Claims**



1. In a method of operating an electromagnetic lock including a first part having a magnetic pole face and a second part magnetically attractable to said pole face arranged for shearing relative motion parallel to said pole faec, the improvement comprising in combination the steps of:

exerting magnetic attraction with said first part on said second part by means of a magnetic field generating a predetermined holding power between said first and second parts;

providing with the aid of non-magnetic material a surface inclined relative to said pole face and translating shearing motion between said first and second parts with the aid of said inclined surface into a lifting force tending to lift said second part away from said first part; and

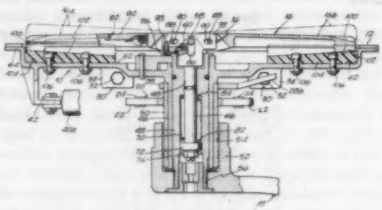
providing between side first and second parts a holding power exceeeding said predetermined holding power by countering said lifting force with said magnetic attraction and a mechanical friction between said first and second parts upon attempted shearing motion therebetween.

4,487,440

AIRCRAFT DOOR BOLT ACTUATING MECHANISM

Gene Beijer, Sepulveda, Calif., assignor to Adams Rite Products, Inc., Glendale, Calif.

Filed Mar. 30, 1981, Ser. No. 248,783
Int. Cl.³ E05B *3/00*; B64C *1/14*
U.S. Cl. 292—336.3 **16 Claims**



1. An aircraft door bolt actuating mechanism, comprising:

a bolt actuating crank having positions of rotation corresponding respectively to the bolted and unbolted positions of the door bolt;

inside and outside door handles connected for unitary rotation and for rotating said crank;

means for moving said outside handle between a generally flush retracted inactivated position and an extended activated position for manually operating said crank including:

an actuating member operatively connected with said outside handle, said member being supported for unitary rotation with said handles and for reciprocable movement in one direction, to retract the outside handle and in a reverse direction to extend said outside handle;

spring means for urging said member in said one direction; and

means responsive to the rotation of said member for moving said member in said reverse direction.

4. An aircraft door bolt actuating mechanism, comprising:

a frame structure adapted for mounting on said door;

a bolt actuating crank rotatably supported on said frame structure for movement to bolted and unbolted positions;

inside and outside door handles carried by said frame structure connected for unitary rotation and for rotating said crank; and

said outside handle having a T-shaped configuration and comprising a pair of oppositely extending hand-grip portions having their adjacent ends pivoted on a common pivot and connected by by interconnecting means for unitary swinging movements between a retracted axially aligned position and an extended position with the handgrip portions in angular outwardly diverging relation.

12. An aircraft door bolt actuating mechanism, comprising:

a bolt actuating crank having positions of rotation corresponding respectively to the bolted and unbolted positions of the door bolt:

inside and outside door handles connected for unitary rotation and for rotating said crank, said outside door handle being pivoted at one end for swinging movements between a generally flush retracted inactivated position and an extended activated position for manually operating said crank;

means for moving said outside handle, including:

an actuating member operatively connected with the pivoted end of said outside handle, said member being supported for unitary rotation with said handles and for reciprocable movement in one direction to retract the outside handle, and in a reverse direction to extend said outside handle;

spring means for urging said member in said one direction; and

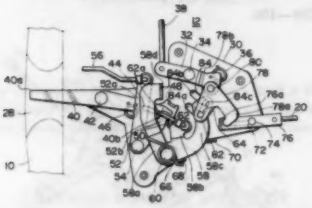
means responsive to the rotation of said member for moving said member in said reverse direction.

4,487,441

CHILD PROOF DOOR LOCKING DEVICE

Issei Miyamoto, Yokohama; Shunji Utsumi, Yokosuka, and Takayo Chikaraishi, Kawasaki, all of Japan, assignors to Nissan Motor Company, Limited and Ohi Seisakusho Co., Ltd., both of Yokohama, Japan

Filed Aug. 31, 1982, Ser. No. 413,529
Claims priority, application Japan, Sep. 29, 1981, 56-153064
Int. Cl.³ E05B *3/00*
U.S. Cl. 292—336.3 **8 Claims**



1. A child proof door locking device for use with an automative door having an inside handle, an outside handle, and a locking knob which are cooperated with one another to operate a latching device mounted to the automotive door, said child proof door locking device comprising:

a base plate structurally adapted to be securely attached to an automotive door;

an inside lever pivotally connected to said base plate and pivotally movable in response to manipulation of an inside handle of an automotive door;

an outside lever pivotally connected to said base plate and pivotally movable in response to manipulation of an outside handle of an automotive door;

first means for causing a latching device of an automotive door to assume its inoperative direction;

second means for linking said outside lever with said inside lever so that pivoting of said inside lever in a given direction induces the pivoting of said outside lever in said given direction;

third means actuated by a locking knob of an automotive door for causing said first means to be inoperative in operating the latching device irrespective of any angular positions assumed by said outside lever; and

a child proof lever pivotally connected to said base plate and disabling said second means when assuming its child proof position.

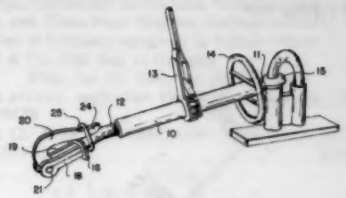
4,487,442

PELICAN HOOK ASSEMBLIES AND METHODS OF MANUFACTURING THE SAME

Eugene F. Grapes, Pittsburgh, and W. W. Patterson, III, Sewickly Heights, both of Pa., assignors to W. W. Patterson Company, Pittsburgh, Pa.

Filed Sep. 29, 1982, Ser. No. 428,253
Int. Cl.³ B66C *1/36*
U.S. Cl. 294—83 R **6 Claims**

1. A fabricated pelican hook assembly comprising an apertured head piece cut from steel plate, a bolt threaded at one end and having the opposite end extending into said aperture at least half way through said head piece and transverse thereto, a pair of generally parallel spaced apart side arms cut from steel plate having one end of each extending generally transversely into said aperture in the head piece from the side opposite the bolt and on opposite sides of said opposite end of said bolt at least half the thickness of said head piece, a weldment substantially filling said aperture around said opposite end of the bolt and the ends of the side arms fixing said bolt and side arms in said head piece and forming a unitary structure, a pelican hook cut from steel plate and having a pivot hole at one end, a pivot pin extending through said pivot hole and fixed in the opposite ends of said pair of side arms with the pelican hook between said side arms and a keeper link generally movable on the bolt to engage the opposite end of the pelican hook from the pivot.

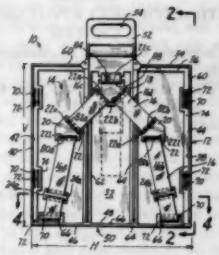


4,487,443

TOTE FOR EASY CARRYING OF BULKY, HEAVY OR ODD-SHAPED LOADS

S. Mark Adamick, Placerville, Calif., assignor to T.B.E., Placerville, Calif.

Filed Feb. 25, 1983, Ser. No. 469,633
Int. Cl.³ B65D *63/18, 71/02*
U.S. Cl. 294—151 **14 Claims**



1. A tote for carrying bulky, heavy and/or oddly shaped loads, comprising a rack and strap assembly adapted to support a load being carried by hand alongside a user's leg, said rack being a unitary molding of high strength synthetic organic plastic and comprising a normally upright, generally rectangular, wall portion having a top and a top edge margin adjacent thereto, side edges and side edge margins adjacent thereto, and a bottom edge and a bottom edge margin adjacent thereto, a foot portion integrally formed with and normally projecting outwardly from said wall portion bottom edge for supporting a load to be carried, and a handle integrally formed with and cantilevered from the top edge of said wall portion offset from the plane of said wall portion to overlie said foot portion; strap retaining means being formed in the wall portion top and bottom edge margins; said strap being retained at said retaining means in length adjustable relation for urging a load against said wall portion in foot portion supported relation, whereby bulky, heavy and oddly shaped loads are supported and balanced on said rack for easy carrying.

4,487,444

REINFORCING INSERT FOR HOSE END SEGMENT

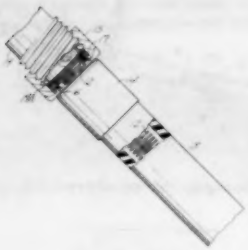
William L. Hensen, 3360 Patricks Point Dr., Trinidad, Calif. 95570

Filed Aug. 27, 1982, Ser. No. 412,231
Int. Cl.³ F16L *13/04*
U.S. Cl. 285—114 **2 Claims**

1. A tubular insert for placement within and reinforcing a

coupling equipped end segment of a flexible conduit, said insert comprising,

a helical spring having a radially enlarged coil at one end of the spring of greater diameter than the remaining coils of the spring, and



a resilient washer defining an annular recess formed within its inner periphery and within which is received said coil, said washer adapted to abut a portion of the conduit coupling to provide a fluid seal in the conventional manner while additionally securing the helical spring against axial displacement within said end segment of the conduit.

4,487,445

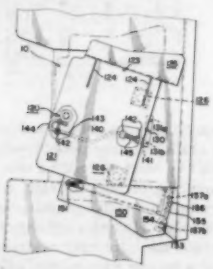
CRAWLER TRACTOR SEAT PIVOTABLE TO RIGHT OF CENTER

Kenneth W. Jonnston, Chatham, Ill., assignor to Fiatallis North America, Inc., Carol Strean, Ill.

Filed Mar. 7, 1983, Ser. No. 472,594

Int. Cl.³ B60N *1/02*; A47C *1/00*

U.S. Cl. 296—65 R **6 Claims**



1. A vehicle seat assembly with portions thereof pivotally movable between predetermined positions to facilitate a vehicle operator's observation and monitoring of auxiliary equipment operable behind the vehicle when the vehicle is moving forwardly, comprising

a seat supporting platform for supporting a vehicle seat upon which a vehicle operator may be seated to operate the vehicle,

seat means secured to said platform means for seating a vehicle operator,

a forward portion of said seat supporting platform being pivotally connected to the vehicle for selective pivotal movement from a first forwardly observing position to a second forwardly and rearwardly observing position which is angulated from said first forwardly observing position, and

an armrest pivotally connected to the vehicle and positioned adjacent to said seat supporting platform for selective pivotal movement relative to the vehicle and said seat supporting platform,

said armrest being pivotable from a first position parallel to said seat supporting platform when said platform is in said first forwardly observing position to a second position angulated from said first position and parallel to said seat supporting platform when said platform is positioned in said second angulated position.

4,487,446

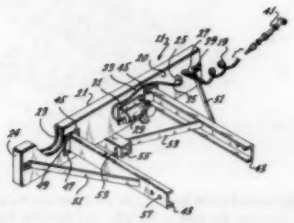
COMBINED BUMPER AND AIR STORAGE SYSTEM

Egon Reich, II, 2076 Mandarin, Costa Mesa, Calif. 92626, assignor to Egon Reich, Newport Beach, Calif.

Filed Jul. 19, 1982, Ser. No. 399,685

Int. Cl.³ B60C *23/10*

U.S. Cl. 296—106 **1 Claim**



1. An apparatus adapted to serve as bumper and air storage tank for a vehicle, said apparatus comprising:

an elongated bumper for a vehicle, said bumper having inner and outer faces;

said bumper being adapted for attachment to a vehicle with the bumper being adjacent to the periphery of the vehicle;

said bumper having a chamber therein, said chamber being substantially airtight and adapted to have compressed air therein;

valve means on the bumper for controlling the flow of air into and out of the chamber;

an air compressor;

means for mounting said air compressor on said bumper on the same side thereof as said inner face and with the air compressor being adjacent said inner face;

said valve means comprising an inlet valve and an outlet valve on said inner face of said bumper and said apparatus including an inlet conduit adapted to be coupled between said air compressor and said inlet valve to permit said air compressor to furnish compressed air to said chamber; and

said mounting means mounting the air compressor on said inner face of the bumper and the apparatus including an electric motor capable of being powered by the battery of the vehicle to which the bumper is attachable for driving the air compressor, and said valve means including a quick disconnect fitting for attaching and detaching a conduit to one of said valves.

4,487,447

CONVERTIBLE TOP FOR PASSENGER MOTOR VEHICLES

Gerhard Schröder, Ditzingen, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche AG, Fed. Rep. of Germany

Filed Jul. 12, 1982, Ser. No. 397,033

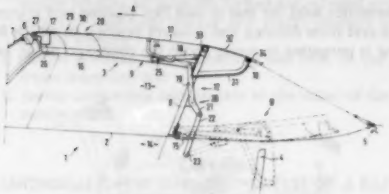
Claims priority, application Fed. Rep. of Germany, Jul. 11, 1981, 3127524

Int. Cl.³ B60J *7/12*

U.S. Cl. 296—108 **9 Claims**

1. A convertible top for a passenger motor vehicle, the convertible top including a top covering, a pair of spaced longitudinally extending side members, a main bow, articulated lever means for connecting the main bow to the side members and a body portion of the motor vehicle, at least one

reinforcement bow connected to the main bow and spaced rearwardly therefrom, as viewed in a normal driving direction of the motor vehicle, said main bow and said reinforcement



bow being formed as a one piece assembly and a rigid form means interposed between and interconnecting the main bow and reinforcement bow for supporting the top covering.

4,487,448

UNITIZED WINDOW ASSEMBLY

Henry W. Griffin, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 26, 1983, Ser. No. 526,669
Int. Cl.³ B60J *1/02*
U.S. Cl. 296—146 **2 Claims**

1. In a vehicle body or the like having an outer panel with a window opening therein including a peripheral flange having a first wall extending generally inwardly of the outer surface and a second wall extending generally in a parallel plane offset from the plane of the outer panel, a unitized window assembly for closing the window opening, comprising,

a window panel receivable in the opening and having a peripheral edge and generally planar front and back surfaces adjacent thereto, the window panel having a plurality of holes passing through the front and back surfaces and spaced inwardly from the peripheral edge,

a mounting frame generally bordering the peripheral edge of the window panel, and including an upper surface visible from outside the vehicle and an under surface engageable with the front surface of the window panel,

attachment members connected to and extending from the under surface of the frame through the holes in the window panel, and resilient retention and sealing members frictionally engageable between the attachment members and the edges of the window panel holes to retain the window panel and mounting frame together as a unitized assembly,

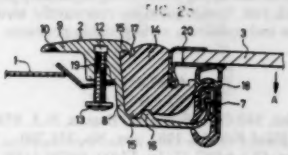
the unitized window assembly being locatable within the window opening with the window panel peripheral edge spaced from the first wall of the window opening flange by passing the attachment members through aligned locating holes in the second wall of the window opening flange until the back surface of the window panel is juxtaposed the second wall of the window opening flange, the addition of fastening members to the attachment members maintaining the assembly in place by drawing the mounting frame under surface toward the window panel front surface while compressing the sealing and retention members to seal the window panel holes.

4,487,449

VEHICLE ROOF CLOSURE PANEL ASSEMBLY HAVING PIVOTABLE RETAINER PLATES

Richard Igel, Germering; Alfons Lutz, Emmering; Hans Jardin, Inning, and Klaus-Peter Srdinko, Unterschleissheim, all of Fed. Rep. of Germany, assignors to Webasto-Werk W. Baier GmbH & Co., Fed. Rep. of Germany

Filed Jun. 15, 1982, Ser. No. 388,621
Claims priority, application Fed. Rep. of Germany, Jul. 28, 1981, 3129658
Int. Cl.³ B60J *7/00*; E05C *3/04, 21/02*; E06B *3/00*
U.S. Cl. 296—216 **13 Claims**



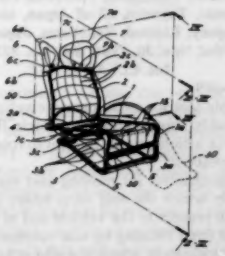
8. A closure assembly for mounting within an exterior body panel of a vehicle, comprising an annular frame of substantially U-shaped cross section surrounding an aperture defined thereby, a closure member connected to the frame for opening and closing said aperture, and a clamping arrangement for engaging a vehicle body panel and securing said frame within an opening thereof; wherein an outer side of the U-shape of the frame is higher than an inner side thereof, the higher side having a flange-like extension for overlying and covering the edge of the vehicle body panel defining said opening; and wherein the clamping arrangement comprises a plurality of retaining plates and mounting screws for the retaining plates, said screws being constructed and arranged so as to pass through a wall of said retaining plates with sufficient clearance to enable pivotal displacement of the retaining plates relative to the screws, in respective planes oriented substantially normal to an interior surface of the roof, to a position which will permit the penetration of the frame into the opening, from the outside of the vehicle, with the screws loosened and the retaining plates attached, as well as toward said interior surface upon tightening of said screws after penetration of the frame into the opening, for pressing the retaining plates against said interior surface.

4,487,450

ARMCHAIR CONVERTIBLE INTO CHAISE LONGUE WITH SEPARATE HINGED BASE AND TILTING HEAD REST

Rodrigo Rodriquez, Carimate, Italy, assignor to Cassina SpA, Meda, Italy

Filed Sep. 16, 1981, Ser. No. 302,792
Claims priority, application Italy, Sep. 18, 1980, 24747 A/80
Int. Cl.³ A47C *13/00*
U.S. Cl. 297—111 **4 Claims**



1. A chair convertible from a seating unit into a chaise longue unit comprising:

a central frame adapted to form a seat and provided with a front end member;

a lower frame hinged to said front end member and swingable between an outwardly swung position in which said lower frame forms a foot rest and extends forwardly of said central frame and a position wherein said lower frame underlies said central frame and forms a base, entirely supporting said central frame and the entire seating unit;

a back-rest frame hinged to said central frame at a rear member thereof and defining a back rest angularly adjustable with respect to said central frame; and

a two-element upper frame forming a head rest, each of the elements of said upper frame being separately pivotable on said back-rest frame between rearwardly swung stable positions and upwardly swung stable positions.

4,487,451

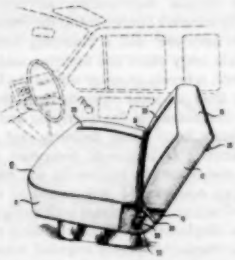
SLEEPER SEAT

Paul J. Fiorini, 142 Oakwood Ave., Bogota, N.J. 07603

Filed Feb. 24, 1982, Ser. No. 351,780

Int. Cl.[3] **A47C** *17/16, 27/00;* **B60N** *1/10*

U.S. Cl. 297—219 **9 Claims**



1. In a seat unit for a vehicle comprising a base portion and an upright back portion slideably adjoined to the vehicle for allowing movement forward or backward in the horizontal plane, the improvement which comprises hinging means for connecting the base and the back portions along a common edge allowing the back portion to move from an upright position to a horizontal position so that the base and back portion form one horizontal unit presenting a smooth, united top, a bag portion covering the entire base and back portion having an opening to allow access to said bag portion, control means to allow release of the back portion from its upright position to its horizontal position, and wherein said bag portion is comprised of two insulated sheets of material lying in face-to-face relation with said opening in one of said insulated sheets to permit access therebetween.

4,487,452

ROTATABLE SEAT FOR AN AUTOMOTIVE VEHICLE

Hiroyuki Tanizaki, Yokohama; Takayoshi Ogawa, Oogaki, and Yoshimi Ozaki, Toyoake, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Nov. 30, 1981, Ser. No. 325,752

Int. Cl.[3] **A47C** *3/18*

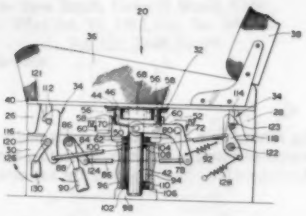
U.S. Cl. 297—349 **14 Claims**

1. A rotatable seat for an automotive vehicle comprising:

a seat rotatably supported on a vehicle floor with a rotational pivot which permits the seat to rotate in a horizontal plane thereabout;

a rotation mechanism for moving said seat between a first position in which the seat faces either forward or backward with respect to the vehicle and in which the seat is prevented from rotating by said rotation mechanism, and a second position in which the seat is permitted to rotate by said rotation mechanism about the rotation pivot;

a latch mechanism for latching the seat in a position facing either forward or backward with respect to the vehicle, said latch mechanism having first and second latching assemblies provided, respectively, at the front and rear of the seat, said first and second latching assemblies being movable between a third position in which said latching assemblies hold the seat in said first position and prevent the seat from rotating and a fourth position in which the seat is permitted to rotate about the rotational pivot; and



an actuator mechanism connected to said rotation mechanism to operate said rotation mechanism to move the seat from said first position to said second position and connected to said latch mechanism to move said first and second latching assemblies from said third position to said fourth position to permit seat rotation.

4,487,453

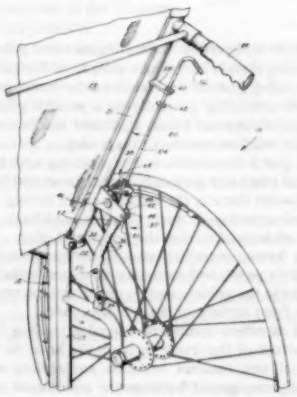
SEAT RECLINER ADJUSTMENT MECHANISM

Harold E. Emmerich, McClure, and Larry A. Richer, Wauseon, both of Ohio, assignors to Gendron, Inc., Archbold, Ohio

Filed Dec. 27, 1982, Ser. No. 453,217

Int. Cl.[3] **A61G** *5/00;* **G05G** *5/06*

U.S. Cl. 297—367 **1 Claim**



1. A recliner adjustment mechanism for a wheel chair having an upper backrest frame member pivotally mounted relative to a lower frame member, comprising:

a. an elongate rack having a plurality of spaced apart detent engaging means extending along one side thereof;

b. a bracket having a detent element engageable with at least a selected one of the detent engaging means of said rack;

c. a wedge support pin on said bracket and spaced from the detent element, said rack extending between said wedge support pin and said detent element;

d. a wedge element slidably disposed between said wedge support pin and said rack, and being moveable between a locked position wherein at least a selected one of the

detent engaging means of said rack is urged into locking engagement with said detent element and a release position wherein said rack is disengaged from said detent element;

e. means coupled to said wedge element for moving said wedge element between the locked and released positions;

f. means for normally biasing said wedge element into the locked position;

g. means pivotally interconnecting said rack to one of the frame members; and

h. means connecting said bracket to the other of the frame members.

4,487,454

ANCHORAGE FOR THE BELT LATCH OF A SAFETY BELT

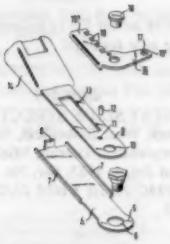
Dieter Biller, Mutlangen, Fed. Rep. of Germany, assignor to REPA Feinstanzwerk, GmbH, Alfdorf, Fed. Rep. of Germany

Filed Apr. 28, 1983, Ser. No. 489,455

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1982, 3216015

Int. Cl.³ B60R *21/00*; A47D *15/00*

U.S. Cl. 297—468 **9 Claims**



1. Anchorage for a belt latch of a safety belt in a vehicle with a height-adjustable seat comprising a lock fitting having one end connected to the belt latch and the other end connected to the height-adjustable seat, a frame fitting relative to which the lock fitting can slide in a guide, a locking part for connecting and locking the lock fitting and the frame fitting upon the application of a strong pulling force on the lock fitting during abnormal operation, a connecting element preventing the locking part from connecting the lock fitting and the frame fitting during normal operation, said locking part in the form of a rocking lever pivoted on one side to the height-adjustable seat and on the other side to the lock fitting, said locking part also having a detent serration adapted upon said application of a strong pulling force to engage a detent element attached to the frame fitting, said connecting element in the form of a shearing pin in normal operation holds the detent serration a distance from the detent element.

4,487,455

WHEEL COVER RETAINING APPARATUS

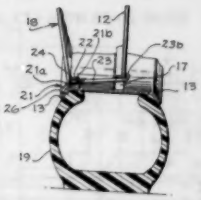
Leo G. Nickoladze, 1155 Kahili St., Kailua, Hi. 96734

Filed May 27, 1983, Ser. No. 498,770

Int. Cl.³ B60B *7/06*, *7/02*

U.S. Cl. 301—37 AT **1 Claim**

1. For use in combination with a vehicle wheel of a type having a web and rim, the web being formed to provide evenly distributed openings defined between said rim and web, a wheel covering having a radially outermost edge margin forming a flange therearound, the wheel cover being applied to one side of the wheel, means for adjustably drawing said edge margin of the cover tightly against said one side of the wheel, the last named means comprising a plurality of brackets uniformly distributed about and carried adjacent the inner surface of said flange of the cover, said brackets protruding primarily toward the wheel, said brackets including a radially inwardly extending portion, openings formed through the last named portions adapted to be aligned with the first named openings in a manner to receive elongate fastening means therethrough in spaced parallel relation to each other, elongate fastening means extending through said aligned openings in a substantially spaced parallel relation, a nut carried on the outer end of each said elongate fastening means to apply forces against the outer



surface of an associated one of said radially inwardly extending portions of said brackets, the inner end of said elongate fastening means including a broadened portion curled backwardly to form a hook for engaging the back surface of said web to retain said fastening means between said cover and said web by rotating said nut to apply forces against the outer surface of said radially inwardly extending portion of its associated bracket.

4,487,456

WHEEL DISC CAST IN SITU WITH INTERLOCKING RIM

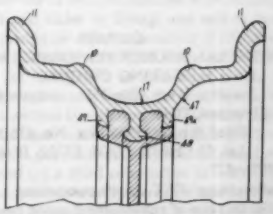
Herbert Zulauf, Feuerthalen, Switzerland, assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Division of Ser. No. 224,472, Jan. 12, 1981,. This application Nov. 17, 1982, Ser. No. 442,260

Claims priority, application Switzerland, Jan. 30, 1980, 761/80

Int. Cl.³ B60B *3/02*, *3/06*

U.S. Cl. 301—63 R **1 Claim**



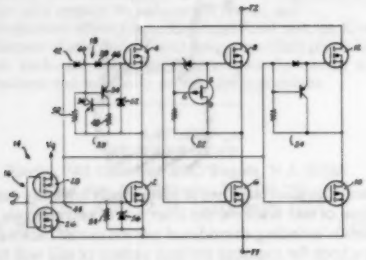
1. A wheel comprising a circular rim portion, said circular rim portion having an outer surface provided with a wheel well and an inner surface provided with a plurality of projections, said plurality of projections comprising a middle T-shaped strut flanked on either side thereof by side struts wherein said side struts define with said middle T-shaped strut a plurality of undercut grooves for receiving a portion of a cast wheel body cast to said plurality of projections on said circular rim portion in situ such that said cast wheel body is secured to said circular rim portion by means of said cast wheel body being joined to said plurality of projections.

4,487,457

GATING CIRCUIT FOR COMBINING SERIES AND PARALLEL CONNECTED FETS

William J. Janutka, West Allis, Wis., assignor to Eaton Corporation, Cleveland, Ohio

Filed Sep. 28, 1982, Ser. No. 425,160
Int. Cl.³ H03K 17/08, 17/12, 17/10, 17/687
U.S. Cl. 307—242 10 Claims



1. A series and parallel stacked FET gating circuit comprising:

a plurality of parallel circuit branches connected between first and second main power terminals, each branch having a plurality of series connected power FETs;

and

gating means for turning said FETs on and off from a single gate terminal, including trigger means responsive to one polarity gate signal to supply gate charging current to all said FETs, and responsive to the opposite polarity gate signal to directly deplete gate charge from selected said FETs, and including fast gate turn-off means for depleting the gate charges of the remaining said FETs through individual self turn-off circuits between their respective gate and source, which circuits become conductive in the absence of gate charging current.

4,487,458

BIDIRECTIONAL SOURCE TO SOURCE STACKED FET GATING CIRCUIT

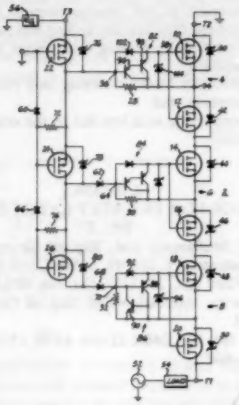
William J. Janutka, West Allis, Wis., assignor to Eaton Corporation, Cleveland, Ohio

Filed Sep. 28, 1982, Ser. No. 425,196
Int. Cl.³ H03K 17/08, 17/10, 17/687
U.S. Cl. 307—577 14 Claims

1. A bidirectional FET circuit comprising:

a plurality of pairs of enhancement mode power FETs, each pair comprising first and second FETs connected source to source in series relation, said pairs connected in series between first and second main power terminals, current conduction in one direction flowing through the series connection of the drain-source current path of said first FET and the forward biased substrate-drain PN junction of said second FET, and in the opposite direction through the series connection of the drain-source current path of said second FET and the forward biased substrate-drain PN junction of said first FET; and

a plurality of gating circuits, one gating circuit for each said pair of power FETs for driving the latter into conduction, wherein said gating circuits are stacked in series for driving said pairs of power FETs sequentially into conduction from a single gate terminal.

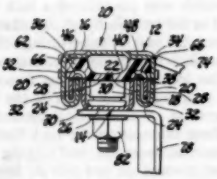


4,487,459

SEAT SLIDE STRUCTURE

Richard W. A. Rees, West Bloomfield, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 1, 1983, Ser. No. 510,374
Int. Cl.³ F16C 29/10; F16M 13/00; B60N 1/08
U.S. Cl. 308—3 R 4 Claims



1. A seat slide structure comprising, in combination, an elongated track member having a base and a generally U-shaped cross-section leg extending laterally from each side of the base and located inwardly thereof, each leg opening to the base of the track member,

a second elongated track member having a base and a generally U-shaped cross-section leg extending laterally from each side of the base and located outwardly thereof, each leg opening outwardly of the base of the second track member, the base of the second track member being juxtaposed to the base of the first track member and the U-shaped legs of the first and second track members interfitting with each other,

slide means interfitting between the base of the first track member and the bight of each U-shaped leg of the second track member to slidably mount the first track member on the second track member,

the bights of the legs of the second track member each being provided with a longitudinal series of locking notches, the notches of the bights being arranged in pairs transversely of the second track member,

a latch member including at least one pair of outwardly extending locking portions which are movable within

vertically elongated slots provided in the legs of the first track member to mount the latch member for movement between a locking position wherein such locking portions are received within a pair of locking notches of the second track member and a released position wherein such portions are free of engagement with any pair of such locking notches to permit horizontal movement of the first track member relative to the second track member,

means biasing the latch member toward locked position, and

means for moving the latch member to released position.

4,487,460

BUSHING ASSEMBLY FOR PRELOADING A THRUST BEARING

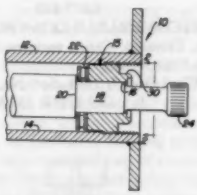
Manfred Becker, Frankenthal, Fed. Rep. of Germany, assignor to Deere & Company, Moline, Ill.

Continuation-in-part of Ser. No. 364,598, Apr. 2, 1982, abandoned. This application Sep. 26, 1983, Ser. No. 535,494

Claims priority, application European Pat. Off., Apr. 9, 1981, 81301557.5

Int. Cl.[3] **F16C** *25/06, 33/08*

U.S. Cl. 384—620 **7 Claims**



1. An improved bushing assembly comprising:

(a) a housing having a cylindrical bore formed therein;

(b) a bushing engageable in said cylindrical bore having a smooth internal bore and a stepped outer circumferential profile, said profile including a smooth circular lead-in surface with an external diameter approximately equal to the diameter of said cylindrical bore, a larger diameter surface containing self-tapping threads for positively engaging an inner portion of said housing surrounding said cylindrical bore, and a collar formed adjacent to said threads and opposite to said lead-in surface, said collar having an external configuration smaller than the outside diameter of said threads;

(c) a rotatable shaft journaled in said internal bore of said bushing, said shaft having a stepped configuration with a shoulder formed therebetween, and a splined end protruding beyond said cylindrical bore of said housing to which a drive mechanism can be attached;

(d) a thrust bearing mounted on said rotatable shaft and sandwiched between said shoulder of said shaft and the lead-in end of said bushing, said thrust bearing having an outside diameter which is smaller than the diameter of said cylindrical bore; and

(e) tool receiving means formed in said collar for receiving a tool which enables said bushing to be threaded into said housing a predetermined amount such that a desired preload can be applied to said thrust bearing.

4,487,461

RACK MOUNTING SYSTEM

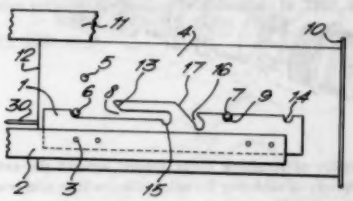
Richard F. Tindall, Wolstanton; Leslie Marshall, Macclesfield, and Stephen Hurlin, Sandbach, all of England, assignors to VG Instruments Group Limited, West Sussex, United Kingdom

Filed Mar. 23, 1983, Ser. No. 477,957

Claims priority, application United Kingdom, Mar. 25, 1982, 8208808

Int. Cl.[3] **A47B** *88/06, 88/18*

U.S. Cl. 312—323 **6 Claims**



1. Apparatus for mounting electrical equipment comprising an equipment case having a front panel, a rear panel and two side panels; said casing being mounted from a rack by two telescopic slides one disposed adjacent each said side panel permitting said case to be withdrawn from said rack on extension of said slides; each said slide comprising a fixed member attached to said rack and a sliding member comprising a rigid elongate support plate; each said support plate being provided with a generally horizontal top edge formed with a substantially horizontal slot opening at its rear end and terminating at its blind front end in a first downwardly formed notch; each said top edge having further formed therein second, third and fourth downwardly formed notches progressively forward of said first notch; each said side panel being provided with at least a first, a second and a third bearing pin each engageable with at least one of said notches in the adjacent slide, said pins retained in engagement with said notches by the action of gravity serving to support said case from said slides; said first pin being disposed forward of said second and third pins and in substantially the same horizontal plane as said second pin, and said third pin being disposed between said first and second pins, above said horizontal plane and nearer to said second pin than to said first pin; said pins, notches and slots being disposed to permit, when said slides are extended, said case to be moved by a lifting action sequentially between at least three orientations and in at least one of said orientations to be removed from engagement with said slides by lifting; and said at least three orientations comprising (a) a first orientation in which said case can be secured in said rack when said slides are closed and in which said first pin is engaged by said third notch and said second pin is disposed in said slot at the rear, upwardly open end thereof, (b) a second orientation in which the rear of said case is clear of said rack and in which said first pin is engaged by said fourth notch and said second pin is disposed part way along said slot, and (c) a third orientation in which the front panel of said case is downwardly directed and in which said third pin is engaged by said second notch and said second pin is engaged by said first notch.

4,487,462

THREADED COUPLING BONDING JUMPER

Edwin J. Gale, Aurora, and Gordon Valentine, Denver, both of Colo., assignors to Stanley Aviation Corp., Denver, Colo.

Filed Jan. 24, 1983, Ser. No. 460,149

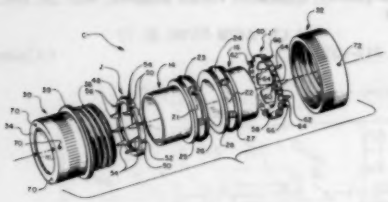
Int. Cl.[3] **H01R** *4/64*

U.S. Cl. 339—14 R **18 Claims**

13. A bonding jumper for use within peripheral retaining grooves of a threaded coupling assembly for interconnecting

confronting ends of first and second fluid-carrying conduit members, said bonding jumper comprising:

a ring having an external peripheral edge extending into said circumferential retaining groove and an internal peripheral edge sized to just slide over the end of said conduit members;



a plurality of retaining tangs spaced around the external periphery of said ring for releasably locking said bonding jumper in said coupling means; and

a plurality of bonding jumper tangs spaced around the internal periphery of said ring, engageable with the end of the conduit member to provide electrical contact between the conduit members through said bonding jumpers and said threaded coupling means.

4,487,463

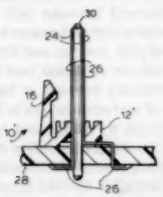
MULTIPLE CONTACT HEADER ASSEMBLY

John Tillotson, Southfield, Mich., assignor to Gulf & Western Manufacturing Company, Southfield, Mich.

Filed Feb. 22, 1983, Ser. No. 468,517

Int. Cl.³ H01R *9/09*

U.S. Cl. 339—17 C **13 Claims**



1. A header assembly for electrical connections comprising:

an insulator,

a plurality of pin members mounted to and projecting from said insulator,

at least one of said pin members including first and second longitudinal electrical contacts separated by a contact insulator,

said contact insulator comprising a longitudinal post having a first end, a second end, and first and second longitudinal grooves running along the exterior surface of said post at least part of the distance between said first and second ends, said first contact being positioned within said first groove and said second contact being positioned within said second groove, each of said contacts including a longitudinal surface projecting beyond the exterior surface of said post, at least one of said contacts being bendable away from the axis of said post near an end thereof.

4,487,464

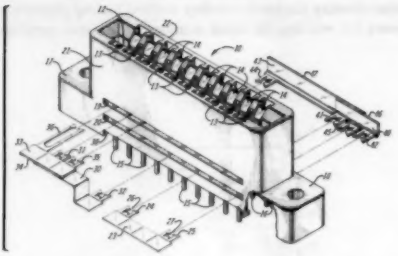
ELECTRICAL SOCKET CONNECTOR CONSTRUCTION

Bernard Kirschenbaum, Denver, Colo., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 7, 1982, Ser. No. 415,024

Int. Cl.³ H01R *31/08*

U.S. Cl. 339—19 **7 Claims**



2. An electrical socket connector construction comprising an insulative housing having an array of electrical contacts for engaging corresponding contacts of an electrical component, said array of electrical contacts terminating respectively in an array of pins extending through the underside of said housing, and an electrically conductive strip having bifurcated tabs extending therefrom adapted to engage predetermined ones of said pins, said housing being formed to permit access to said last-mentioned pins by said tabs.

4,487,465

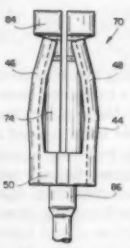
HEAT RECOVERABLE CONNECTING DEVICE

Gabe Cherian, Fremont, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Filed Dec. 7, 1981, Ser. No. 328,161

Int. Cl.³ H01R *13/20*

U.S. Cl. 339—30 **2 Claims**



1. A heat-recoverable connecting device, comprising:

a generally planar sheet of shape-memory metal capable of reversing between a martensitic state and an austenitic state defining a driver member including at least two generally parallel arms and an interconnecting support, the arms being cantilevered from the support for movement out of the plane of the sheet; and

a second member connected to said driver member, said second member having at least two resilient legs diverging from the plane of said driver member, said second member further including engagement means to contact and exert a high engaging force on a substrate that may be inserted between said legs when said legs are moved toward the plane of said driver member back toward each other, said resilient legs capable of bending said arms out of the plane of the driver member in opposite directions with respect to the plane of the driver when the metal of the driver

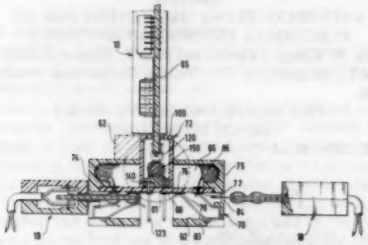
member is in the martensitic state, said arms capable of overcoming said bending when the metal of said driver member is in the austenitic state to cause engagement means to contact and exert a high engaging force on such a substrate.

4,487,466

SERIES/PARALLEL ELECTRICAL CONNECTOR, PARTICULARLY FOR USE WITH CHASSIS-MOUNTED PRINTED CIRCUIT CARDS

André Petit, Longpont sur Orge, and Daniel Jamet, Nozay, both of France, assignors to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Dec. 13, 1982, Ser. No. 449,343
Claims priority, application France, Dec. 11, 1981, 81 23181
Int. Cl.³ H01R *29/00, 27/02*
U.S. Cl. 339—32 M **17 Claims**



1. A series/parallel connector comprising a socket having a pair of contact terminals and a plug insertably received by said socket; the improvement

wherein the socket comprises: a portion of a printed circuit card having a pair of contact tabs disposed on the same face of the card, close to a first edge of the card, at different distances therefrom, and at a predetermined spacing from each other; an insulating housing mounted on said first edge of the card over said pair of contact tabs; and a pair of electrically interconnected spring blades mounted by said housing and making resilient contact with respective ones of said tabs; said housing further including an opening for receiving said plug; and

wherein said plug comprises a planar insulating support bearing first and second spring contact blades, said first spring contact blade providing first and second contact points on a first side of said insulating support together with a third contact point on a second side of said insulating support opposite to said first side thereof, and said second spring contact blade providing a single fourth contact point on said second side of said insulating support, said contact points on each side of said support being at said predetermined spacing;

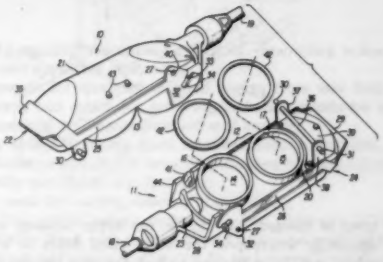
the relative disposition of said plug and said socket being such that when said plug is received in said socket, the contact points on one side of the plug make contact with respective ones of the tabs while the contact points on the other side of the plug make contact with respective ones of the spring blades of the socket, whereby inserting the plug one way in said opening causes the spring contact blades of the plug to be electrically interconnected by the electrically interconnected spring blades of the socket, while the contact tabs of the socket are electrically interconnected by the first spring contact blade of the plug, thereby establishing a parallel connection between the plug and the contact tabs; and whereby rotating the plug through 180° and inserting it inverted in said opening, causes a first one of the contact tabs to be connected to the first spring contact blade of the plug whose other two contact points are in contact with the already electrically interconnected spring blades of the socket, while the other contact tab is connected to the second spring contact blade of the plug, thereby establishing a series connection between the plug blades and the contact tabs.

4,487,467

ELECTRIC CONNECTION DEVICE FOR COUPLING MULTIPLE-CONDUCTOR CABLES

Michel Guerrero, and Didier Doret, both of Suresnes, France, assignors to Socapex, Suresnes, France

Filed Mar. 8, 1982, Ser. No. 358,338
Claims priority, application France, Mar. 10, 1981, 81 04718
Int. Cl.³ H01R *25/00, 13/639*
U.S. Cl. 339—49 R **10 Claims**



9. An electric connection device for coupling multiple-conductor cables, said device comprising a pair of hermaphroditic identical connectors each having an electric connection face composed of a group of male connection conductors and of a group of female connection conductors coupled to a multiple-conductor cable, said groups being mounted in such a manner as to ensure that they can be connected respectively to groups of female and male connection conductors of the electric connection face which is coupled to a multiple-connector cable of the other hermaphroditic connector, each connector being further provided with mechanical locking means for ensuring electrical and mechanical interconnection of the groups of conductors within the other connector as well as compression of resilient means for ensuring imperviousness of the device in the locked state, wherein the mechanical locking means of each connector comprises a locking stirrup mounted on the connector body so as to be capable of pivotal displacement between a position in which the two connectors are unlocked and separately movable and a position in which said two connectors are locked, the locking operation being performed by causing the stirrups to rotate to a position behind end faces respectively of covers of the connectors, projecting portions on the bodies of the two connectors being engaged during the rotaitonal displacement of said stirrups within means provided in the locking stirrups, said projecting portions being housed within notches formed in upright longitudinal walls extending along the two longitudinal edges of each connector between an end face thereof and a compartment in which connecting conductors of the connector are housed.

4,487,468

CARD EDGE CONNECTOR LOCKING DEVICE

James L. Fedder, Harrisburg, and Attalee S. Taylor, Palmyra, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

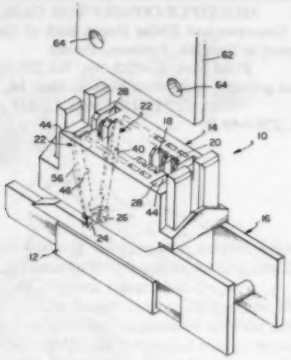
Filed Dec. 27, 1982, Ser. No. 453,653
Int. Cl.³ H01R *13/639*
U.S. Cl. 339—75 MP **5 Claims**

1. A locking device for use with card edge connectors of the type having a lower housing, a vertically moving upper housing, a card receiving slot and cavities normal to and opening into the slot, said locking device comprising:

a. a pair of identical, elongated arms, pivotally mounted at

their lower ends to the lower housing with the pivotal motion being normal to the card receiving slot, said arms extending upwardly into the cavities in the upper housing and having on their upper ends a nose which faces towards the slot; and

b. a first follower on one side of each arm and cooperative cam means on the cavity wall adjacent thereto to pivot the



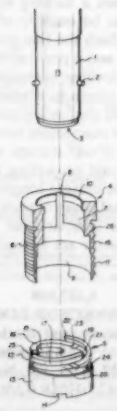
arms in towards the slot as the upper housing moves upwardly whereupon the noses enter holes in a card which may be in the slot to lock the card therein, and a second follower on the other side of each arm and cooperative cam means on the cavity wall adjacent thereto to pivot the arms out from the slot as the upper housing moves downwardly whereupon the noses are withdrawn from the holes to unlock the card.

4,487,469

MOUNTING SOCKET FOR A PROXIMITY SWITCH

Hilmer Björk, Karlskoga, Sweden, assignor to Aktiebolaget Bofors, Bofors, Sweden

Filed Jul. 23, 1982, Ser. No. 401,292
Claims priority, application Sweden, Aug. 31, 1981, 8105121
Int. Cl.³ H01R *13/625*
U.S. Cl. 339—88 R **8 Claims**



1. A mounting socket for an inductive proximity switch of the type having a plurality of guide pins on an outer cylindrical wall for cooperating with the mounting socket when mounting and dismounting the switch in the socket and for locking the switch at a defined distance from an element to be sensed, said mounting socket comprising:

a housing having a plurality of guide slots corresponding in number to the guide pins of the switch and located on an inner cylindrical wall for guiding the proximity switch towards and away from said sensed element, and,

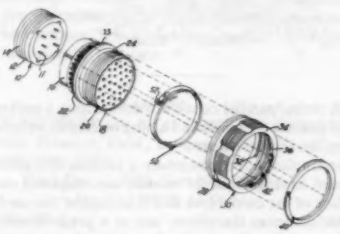
a spring part positioned in said housing and having a plurality of resilient spring elements corresponding in number to the guide pins of the switch, said spring elements being arranged to cooperate with the guide pins so as to lock the proximity switch in a stop position at a fixed precisely defined distance from the sensed element in which stop position movement of the switch towards the sensed element is prevented while movement of the switch away from the sensed element against the resilience of the spring elements is permitted.

4,487,470

ANTI-DECOUPLING MECHANISM FOR AN ELECTRICAL CONNECTOR ASSEMBLY

Anthony W. Knapp, Laurens, and Eric F. Shepler, Sidney, both of N.Y., assignors to The Bendix Corporation, Southfield, Mich.

Filed May 11, 1983, Ser. No. 493,534
Int. Cl.³ H01R *13/623*
U.S. Cl. 339—89 M **8 Claims**



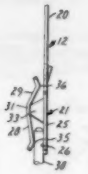
1. An anti-decoupling mechanism for a separable electrical connector assembly, the electrical connector assembly comprising first and second generally cylindrical connector shells adapted for mating engagement along their primary axis and a coupling nut including a coupling sleeve mounted for rotation relative to one of said connector shells and having thread adapted to engage with corresponding thread on the other connector shell, said coupling nut and one connector shell including, respectively, an annular flange and a radial flange with said mounting disposing the flanges in abutting relation whereby coupling rotation of the coupling nut axially draws the flanges tightly against one another and the thread into tight frictional engagement, said anti-decoupling mechanism resisting only uncoupling rotation of the coupling nut, the anti-decoupling mechanism characterized by:

a thin, flat, elongated band of flexible material having one end portion thereof connected to said coupling sleeve and its other end portion thereof radially coiled about said one connector member, the intermediate portion of said band radially overlapping and superposing itself such that the other end portion is closely confined by the band against the one connector shell, rotation of the coupling nut from a first position to a second position driving the band from a loosely coiled and a tightly coiled condition, respectively, relative to said one connector member, said loosely coiled condition not resisting rotation of the coupling nut relative to either of the connector members and said tightly coiled condition resisting rotation of the coupling nut and said one connector member as a result of friction forces developing between overlapped band portions.

4,487,471
SOCKET CONNECTOR

Lane A. Freshwater, Lino Lakes, and Eugene E. Moynagh, Jr., Afton, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 6, 1983, Ser. No. 456,533
Int. Cl.[3] H01R 13/12, 13/38
U.S. Cl. 339—99 R 6 Claims

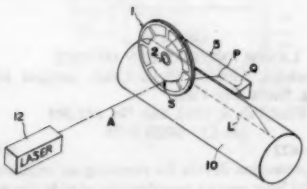


1. A socket connector comprising:
an insulating body having a plurality of contact element apertures therethrough from a connecting surface to an opposed external surface, and
a plurality of contact elements, one in each of said contact element apertures, each said contact element being stamped from sheet metal and having a connecting end extending from said connecting surface and a pin contacting end within a said contact element aperture, said pin contacting end having a main body portion with a pin guiding and contacting surface and a pair of pin contact areas spaced from and facing said pin guiding and contacting surface and spaced from each other longitudinally with respect to the insertion of a pin into the contact element aperture, said pin contact areas being defined on a pair of spring arms facing said pin guiding and contacting surface and cantilevered in opposite directions from a bridge, said bridge being connected along one edge to a connecting link extending between said main body portion and said bridge and having a greater area of connection to said main body portion than to said bridge.

4,487,472
LIGHT BEAM SCANNING APPARATUS

Eiji Asano, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 2, 1982, Ser. No. 394,831
Claims priority, application Japan, Jun. 7, 1981, 56-106061
Int. Cl.[3] G02B 27/17; G01D 9/42
U.S. Cl. 350—3.71 12 Claims

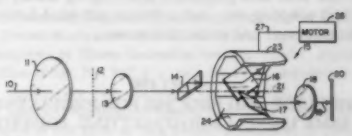


1. A light beam scanning apparatus comprising;
a rotatable disk hologram scanner for deflecting the incident light beam and having a plurality of diffraction gratings exactly identical in construction and radially arranged equidistantly along the periphery thereof;
an object surface on which the light beam is scanned; and
a prism member suitably arranged on an optical axis between said hologram scanner and said object surface so that a scanning locus on said object surface is approximately corrected to linear form.

4,487,473
ONE DIMENSIONAL SCANNING SYSTEM

Marcus R. Hatch, Waltham, and William J. Lepsevich, Dedham, both of Mass., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 31, 1981, Ser. No. 336,238
Int. Cl.[3] G02B 27/17
U.S. Cl. 350—6.8 9 Claims

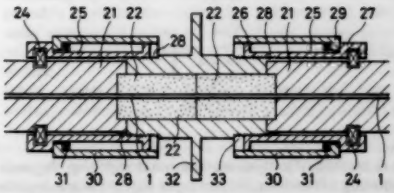


1. Apparatus for scanning a field of view along a line of sight, said apparatus comprising:
A. means for receiving infrared energy from said field of view, said means for receiving including means for substantially collimating said infrared energy;
B. a hollow scanning drum rotatable about a first axis, including a plurality of inwardly reflecting surfaces substantially parallel to said first axis;
C. means for causing rotation of said drum;
D. first optical means, including a first stationary folding mirror, fixed with respect to said drum and positioned to direct said energy collimated by said means for collimating to impinge in a substantially collimated manner on said reflecting surfaces successively as said drum rotates;
E. at least one radiation sensitive detector fixed with respect to said drum; and
F. second optical means, including a second stationary folding mirror, fixed with respect to said drum and arranged to receive substantially collimated energy reflected from said reflecting surface and arranged to direct such collimated energy toward said at least one radiation sensitive detector so that the plane of incidence of the optical axis at said reflecting surfaces is substantially perpendicular to said first axis.

4,487,474
OPTICAL CONNECTOR WITH CERAMIC PLUGS AND SLEEVE

Mitsuaki Nishie; Satoru Iguchi, and Ichiro Kono, all of Kanagawa, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jul. 6, 1981, Ser. No. 280,043
Claims priority, application Japan, Jul. 8, 1980, 55-95179[U]; Jul. 8, 1980, 55-95181[U]; Jul. 8, 1980, 55-92219[U]; Jul. 10, 1980, 55-96192[U]
Int. Cl.[3] G02B 7/26
U.S. Cl. 350—96.21 3 Claims



1. An optical connector comprising: a ceramic plug; a plug support, a rear end of said ceramic plug being supported on a front end of said plug support, an optical fiber extending coaxially through said plug support and said ceramic plug terminating at a front end of said ceramic plug; a rotary ring disposed

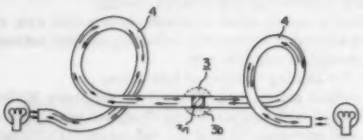
around said plug support fitted in an outer peripheral surface of said plug support; a coupling nut rotatably mounted around said rotary ring, said coupling nut having an outer peripheral surface provided with a front end stop projection and a rear end stop projection, said rotary ring being positioned behind said rear end stop projection, and said coupling nut being internally threaded for connection to a receptacle; a cylindrical protective cover having a radially inwardly projecting flange at its rear end, said protective cover being axially movable over said coupling nut; and a spacer provided between said coupling nut and said protective cover.

4,487,475

LIGHTGUIDE AND PROCESS FOR PRODUCING THE SAME USING A PHOTO-SETTING ADHESIVE

Kazufumi Ogawa, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Aug. 24, 1981, Ser. No. 295,370
Claims priority, application Japan, Sep. 1, 1980, 55-121645
Int. Cl.³ G02B 7/26
U.S. Cl. 350—96.21 **6 Claims**



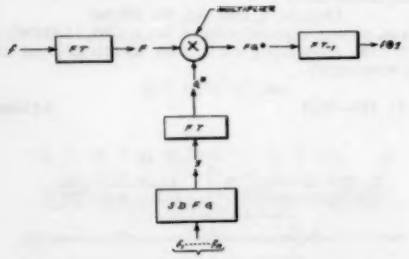
1. A lightguide comprising a plurality of optical fibers having substantially the same diameter which are end connected together with their optical axes aligned by means of a photo-setting type adhesive, said adhesive having substantially the same diameter as that of said optical fibers.

4,487,476

METHOD OF MULTIVARIANT INTRACLASS PATTERN RECOGNITION

Charles F. Hester, Huntsville, Ala., and David P. Casasent, Pittsburgh, Pa., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 28, 1981, Ser. No. 258,500
Int. Cl.³ G06G 9/00
U.S. Cl. 350—162.13 **3 Claims**



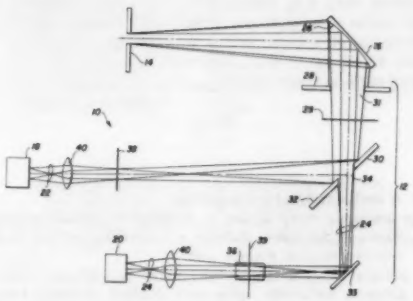
1. A method of pattern recognition comprising the steps of:
inputting a transform F of an input object f into a correlator:
inputting said transform F into a matched spatial filter having a transmittance proportional to H* wherein said H* is a conjugate transform of a multiclass reference function defined by h, said matched filter outputting a transform FH*, and
forming a transform correlation product f * h of FH*.

4,487,477

OPTICAL BEAM SPLITTER

Charles C. Helms, Trumbull, and John G. Atwood, Redding, both of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Continuation of Ser. No. 241,349, Mar. 6, 1981, abandoned. This application Feb. 28, 1983, Ser. No. 470,427
Int. Cl.³ G02B 27/14
U.S. Cl. 350—172 **5 Claims**



1. An achromatic beam splitter apparatus comprising:
a first optical element, said first element having a first aperture therethrough, said aperture being adapted to act as an optical stop when positioned in the path of a light beam from a light source;
a single reflective achromatic means for directing said light beam onto said first optical element, and single surface reflective directing means being arranged to direct said light beam onto said first element such that said light beam uniformly illuminates and overfills said first aperture whereby said first aperture is always filled regardless of mechanical instabilities; and
a single surface reflective achromatic optical means, having a second aperture therethrough, positioned so as to receive all of said light beam passing through said first optical element, for dividing said light beam received into two resultant light beams, one resultant light beam being that portion of said light beam reflected by the single reflective surface of said optical means and the other resultant light beam being that portion of said light beam passing through said second aperture of said optical means, said optical means being adapted to maintain a constant preselected ratio of light energies between said resultant light beams regardless of mechanical instabilities.

4,487,478

LASER PROTECTION DEVICE

Robert E. Jackson, Mission Viejo, Calif., assignor to PDA Engineering, Santa Ana, Calif.

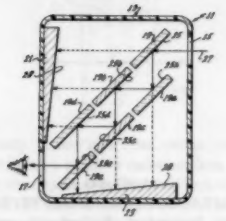
Filed Feb. 9, 1982, Ser. No. 347,349
Int. Cl.³ G02B 5/26
U.S. Cl. 350—622 **8 Claims**

1. A laser protection device for receiving an incident beam having harmful laser energy wavelengths outside the primary visible range which has all wavelengths from 420 nm to 680 nm and on one side of the primary visible range which side is either below 420 nm or above 680 nm and non-harmful energy wavelengths within the visible spectrum and for separating the laser energy wavelengths from the non-harmful energy wavelengths and wherein the harmful laser energy wavelengths are harmful to the eye of an observer or to photosensitive equipment and the non-harmful energy wavelengths are not harmful to the eye of an observer or to photosensitive equipment, said laser protection device comprising:
a first edge filter arranged to receive the incident beam, said

first edge filter including means for providing a first reflected beam and a first transmitted beam, one of said beams provided by said first edge filter having a relatively high percentage of the nonharmful energy wavelengths within the visible spectrum and a relatively low percentage of the harmful laser energy wave-lengths outside the primary visible range and the other of said beams provided by said first edge filter having a relatively high percentage of the harmful laser energy wavelengths and a relatively low percentage of the non-harmful energy wavelengths;

a second edge filter arranged to receive said one beam provided by said first edge filter, said second edge filter comprising means for providing a second reflected beam and a second transmitted beam, one of said beams provided by said second edge filter comprising a higher percentage of the non-harmful energy wavelengths than the beam received by said second edge filter and the other of said beams provided by said second edge filter having a higher percentage of the harmful laser energy wavelengths than the beam received by said second edge filter; and

each of said edge filters having an edge between the non-harmful energy wavelengths within the visible spectrum and the harmful laser energy wavelengths outside the primary visible range on said one side of the primary visible range.



4,487,479

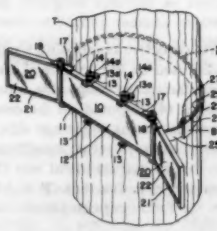
HUNTER'S REAR VIEWING MIRROR DEVICE

Joseph F. Tolomeo, Sr., 19 Marycrest Dr., Pittsburgh, Pa. 15235

Filed Mar. 10, 1983, Ser. No. 474,200

Int. Cl.³ G02B *5/08*

U.S. Cl. 350—615 **15 Claims**



1. A hunter's rear viewing mirror device for secure, removable and adjustable mounting at a suitable viewing height on an above-ground support such as a tree trunk or limb which comprises, a central mirror part and a pair of endwise mounted side mirror parts, each of said mirror parts having a mirror and a supporting frame, means swingably mounting said pair of side mirror parts on opposite ends of said central mirror part, means cooperating with said swingable means for retaining said side mirror parts in a desired adjusted endwise-tilted relation with respect to said central mirror part, strap mounting means secured to a back side of the supporting frame of said central mirror part, and an adjustable strap means adapted to be secured to said mounting means to extend in a secure relation about the support at a suitable above-ground height for mounting said mirror parts in a suitable back-viewing position for the hunter.

4,487,480

MULTI-LAYER MATRIX TYPE LIQUID CRYSTAL DISPLAY PANEL

Keisaku Nonomura; Toshiaki Takamatsu, both of Nara; Hisashi Uede, Yamatokoriyama, and Tomio Wada, Ikoma, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

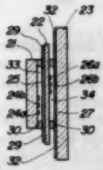
Continuation of Ser. No. 943,871, Sep. 19, 1978, abandoned. This application Feb. 25, 1983, Ser. No. 469,782

Claims priority, application Japan, Sep. 22, 1977, 52-115308

The portion of the term of this patent subsequent to Jun. 22, 1999, has been disclaimed.

Int. Cl.³ G02F *1/13*

U.S. Cl. 350—335 **3 Claims**



1. A matrix type liquid crystal display panel including an M×N array of display elements arranged across a display area, comprising:

first support means, generally planar and for supporting first plurality of electrodes numbering M extending thereacross in a first direction;

second support means arranged generally parallel to said first support means and spaced apart therefrom for supporting a second and third plurality of electrodes, said second support means having first and second support surfaces,

said first support surface generally facing said first support means and having a second plurality of electrodes extending across said first support surface in a second direction substantially orthogonal to said second direction, said first plurality of electrodes numbering ½ N and being substantially equispaced across half the display area;

said second support surface having a third plurality of electrodes numbering M extending thereacross in said first direction;

third support means arranged generally parallel to said second support means and spaced apart therefrom, said third support means supporting a fourth plurality of electrodes extending thereacross in said second direction, said fourth plurality of electrodes numbering ½ N and being substantially equispaced across the half of said display area not having said second plurality of electrodes arranged thereacross;

a liquid crystal material disposed between said first and second substrates and between said second and third substrates;

the size in said first direction of said first support means being longer than the size of said second support means in that direction which in turn is longer than the size of said third support means in said first direction;

the size in said second direction of said first support means being shorter than the size of said second support means in that direction which in turn is shorter than the size of said third support means in said second direction;

the sizing of said first, second and third support means ex-

posing the ends of said electrodes to facilitate simplified connection to said electrodes.

4,487,481

BACKLIGHTED LIQUID CRYSTAL DISPLAY

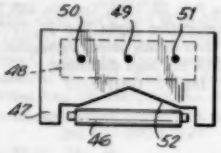
Osamu Suzawa, Shiojiri, Japan, assignor to Epson Corporation, Tokyo, Japan

Filed Mar. 20, 1981, Ser. No. 245,856

Claims priority, application Japan, Mar. 24, 1980, 55-38295[U]; Jun. 5, 1980, 55-75831; Jun. 26, 1980, 55-87056

Int. Cl.³ G02F *1/13*

U.S. Cl. 350—345 **11 Claims**



1. A liquid crystal display device comprising:
a liquid crystal panel having a length and a width;
an elongated light source means for illuminating said liquid crystal display panel;
a light passage member of one of a transparent and a translucent material, said light passage member being disposed between said liquid crystal panel and said light source means and formed with a recess in the light inlet surface facing said light source means, said light passage member being substantially as wide as said liquid crystal panel, said recess being adapted to provide backlighting of uniform intensity, said recess and said elongated light source means being substantially as long as said light passage member and said liquid crystal panel are wide;
and a light reflection member substantially surrounding said light reflecting member having an opening facing said liquid crystal display panel to expose a surface portion of said light passage member.

4,487,482

STOP DOWN STRUCTURE FOR FACSIMILE ZOOM LENS

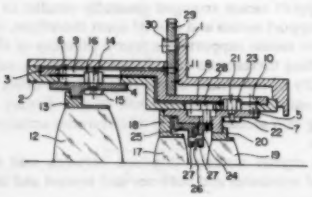
Takayuki Itoh, and Yoshihiro Hama, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 27, 1981, Ser. No. 315,562

Claims priority, application Japan, Oct. 28, 1980, 55/151045

Int. Cl.³ G02B *15/16, 13/24*; H04N *1/04*

U.S. Cl. 350—429 **5 Claims**



1. In a variable image magnification, line-scanning type facsimile apparatus of the type having a zoom lens with at least one lens movable along an optical axis to vary the image magnification, said zoom lens having a numerical aperture, and a line sensor for receiving light through said zoom lens, the improvement comprising correction means for correcting the numerical aperture of said zoom lens by an amount corresponding to the position of said at least one lens along said optical axis, said correction means adjusting said numerical aperture in accordance with the equation:

$$F_\infty(1+m/\phi)=K$$

where F_∞ is the F number of said zoom lens for an object at an infinite distance, m is the lateral magnification of said zoom lens, $m>0$, ϕ is the pupil magnification of said zoom lens, and K is a constant, thereby maintain substantially constant the optical energy received by said line sensor for a substantially constant main scanning rate and an auxiliary scanning rate proportional to 1/m.

4,487,483

CATADIOPTRIC OBJECTIVE

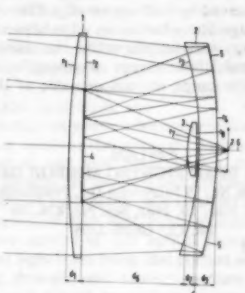
Frits J. Versteeg, Rotterdam, Netherlands, assignor to N.V. Optische Industria "De Oude Delft", Delft, Netherlands

Filed Dec. 9, 1982, Ser. No. 448,198

Claims priority, application Netherlands, Dec. 22, 1981, 8105795

Int. Cl.³ G02B *17/08*

U.S. Cl. 350—444 **4 Claims**



1. A catadioptric objective comprising a negative lens (2), a main mirror (5) disposed on the peripheral area of the surface of the negative lens facing the image side, a positive front lens (1), a counter mirror (4) disposed on the central area of the surface of the front lens facing the image side, and a field lens (3) mounted adjacent to the negative lens (2) on the object side thereof, characterized in that said field lens (3) is mounted in spaced relation to said negative lens (2) and the catadioptric objective satisfies the following conditions:

$$-0.4 < \frac{n_2-1}{r_3} + \frac{1-n_3}{r_3} < -0.05$$

and

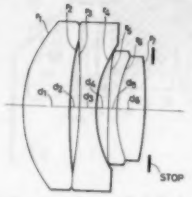
$$1.46<(n_1,n_2)<1.70$$

wherein n_1, n_2 and n_3 are the refractive indices of the front lens (1), the negative lens (2) and the field lens (3) respectively, and r_3 and r_3 are the radii of curvature of the adjacent surfaces of the field lens (3) and the negative lens (2) respectively.

4,487,484
BEHIND-STOP TESSER TYPE LENS SYSTEM

Shin-ichi Mihara, Hachiouji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Sep. 14, 1983, Ser. No. 532,150
Claims priority, application Japan, Sep. 16, 1982, 57-161466; Jan. 26, 1983, 58-11075
Int. Cl.³ G02B 9/20
U.S. Cl. 350—449 2 Claims



1. A behind-stop Tesser type lens system comprising a first lens component being a positive meniscus lens with its convex surface faced to the object-side, a second lens component being a biconcave lens and a third lens component being a cemented doublet lens comprising a negative meniscus lens and a biconvex lens and characterized in having the following numerical data:

	f = 1		
$r_1 = 0.3546$			
	$d_1 = 0.1354$	$n_1 = 1.77250$	$\nu_1 = 49.66$
$r_2 = 0.9671$			
	$d_2 = 0.0305$		
$r_3 = -1.3861$			
	$d_3 = 0.0458$	$n_2 = 1.68893$	$\nu_2 = 31.08$
$r_4 = 0.3166$			
	$d_4 = 0.0349$		
$r_5 = 1.9547$			
	$d_5 = 0.0232$	$n_3 = 1.59270$	$\nu_3 = 35.29$
$r_6 = 0.3403$			
	$d_6 = 0.0817$	$n_4 = 1.80610$	$\nu_4 = 40.95$
$r_7 = -0.7744$			

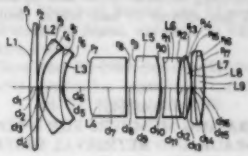
In the above, reference symbols r_1 through r_7 respectively represent radii of curvature of respective surfaces of lenses, reference symbols d_1 through d_6 respectively represent thicknesses of respective lenses and airspaces between lenses, reference symbols n_1 through n_4 respectively represent refractive indexes of respective lenses, and reference symbols ν_1 through ν_4 respectively represent Abbe's numbers of respective lenses.

4,487,485
RETROFOCUS WIDE-ANGLE PHOTOGRAPHIC LENS SYSTEM

Masaharu Hisada, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1982, Ser. No. 431,929
Claims priority, application Japan, Oct. 30, 1981, 56-173751
Int. Cl.³ G02B 9/64, 13/04
U.S. Cl. 350—459 4 Claims

1. A retrofocus wide-angle photographic lens system comprising in order from the object, a first positive-meniscus lens having a convex surface directed toward the object, second and third negative-meniscus lenses having convex surfaces directed toward the object, fourth and fifth positive lenses, a sixth biconcave lens, a seventh positive lens, an eighth negative lens, and a ninth positive lens, said eighth and ninth lenses forming a doublet to have a positive composite focal length, said lens system satisfying the following requirements:



$$\frac{F}{1.3} < |F_{1\text{-}2\text{-}3}| < \frac{F}{0.8} \ (F_{1\text{-}2\text{-}3} < 0) \quad (1)$$

$$1.0 < \frac{F_2}{F_3} < 1.4 \quad (2)$$

$$\frac{F}{0.6} < |F_{1\text{-}2\text{-}3\text{-}4}| < \frac{F}{0.2} \ (F_{1\text{-}2\text{-}3\text{-}4} < 0) \quad (3)$$

$$\frac{F}{0.5} < |F_{1\text{-}2\text{-}3\text{-}4\text{-}5\text{-}6}| < \frac{F}{0.3} \ (F_{1\text{-}2\text{-}3\text{-}4\text{-}5\text{-}6} < 0) \quad (4)$$

$$0.5F < d_7 + d_8 + d_9 < 0.7F \quad (5)$$

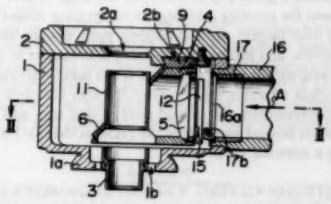
$$n_8 > 1.75 \text{ and } n_9 > 1.75 \quad (6)$$

where F is the overall focal length of the lens system, $F_{1,2 \cdots i}$ is the composite focal length up to the ith lens, F_i is the focal length of the ith lens, d_j is the lens-to-lens distance or thickness of the jth lens, and n_i is the refractive index of the ith lens at the d-line.

4,487,486
VERTICAL ILLUMINATOR FOR MICROSCOPE

Toshimi Hayasaka, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Japan

Filed Jul. 8, 1982, Ser. No. 396,407
Claims priority, application Japan, Jul. 28, 1981, 56-117984; Jul. 28, 1981, 56-117985; Oct. 12, 1981, 56-162426; Oct. 12, 1981, 56-162427
Int. Cl.³ G02B 21/10, 21/12
U.S. Cl. 350—525 15 Claims



1. A vertical illuminator for a microscope which permits a change between a dark field and a bright field illumination through a switching of a reflecting mirror and an illumination lens, comprising:

a light path switch block including bright field illumination optics and dark field illumination optics, said block being disposed with a frame and movable between a dark field illumination position wherein said dark field illumination optics aligns with the optical path of a source of light and a bright field position wherein said bright field illumination optics aligns with said optical path of a source of light;

a light diminishing member disposed so as to be automatically inserted into said optical path when said block is moved into said bright field illumination position; and

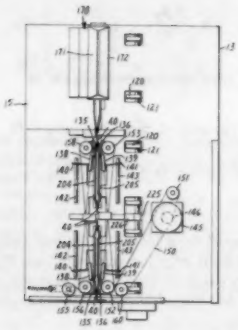
a human actuable expel mechanism capable of retracting said light diminishing member from said optical path when said block has moved to said bright field illumination position.

4,487,487

CARD SEPARATING MEMBERS FOR A MICROFICHE STORAGE AND RETRIEVAL SYSTEM

John E. Burbank, III, Ridgefield, Conn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 11, 1983, Ser. No. 474,570
Int. Cl.³ G03B *23/08*
U.S. Cl. 353—103 **7 Claims**



1. In a microfiche card storage and retrieval device having a tray for storing a plurality of microfiche cards with edges of the cards disposed in generally parallel alignment in selective slots formed in said tray, the improvement comprising

an aiming plate disposed adjacent the peripheral edge of the tray to be positioned adjacent one of said slots supporting one of said microfiche cards,

a pair of fingers disposed one on each side of said aiming plate, in a rest position,

means for moving said fingers from said rest position toward a position generally centrally of the edge of said tray, said means for moving said fingers comprising means for moving said fingers on a diverging path toward said center position, and means for returning said fingers to a position on said aiming plate such that when said fingers are in said position adjacent the center of the tray the cards adjacent the preselected one of said slots in said tray will have the centers bowed away from the preselected slot for supporting a selected card.

4,487,488

MICROFICHE GUIDANCE AND BUCKLING DETECTION SYSTEM

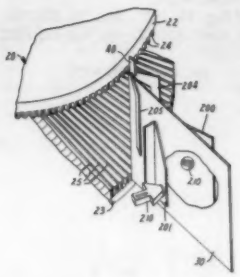
John E. Burbank, III, Ridgefield, Conn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 11, 1983, Ser. No. 474,539
Int. Cl.³ G03B *23/08*
U.S. Cl. 353—122 **3 Claims**

1. In a microfiche card storage and retrieval system wherein cards are automatically handled by a mechanical card transport assembly movable into and out of a storage tray, the improvement comprising:

guide plates positioned adjacent the storage tray with said guide plates converging toward the storage tray to define a microfiche card guiding chute, said plates each having an aperture formed therein, and

detection means positioned at each aperture in said plates, said detection means comprising means for detecting a



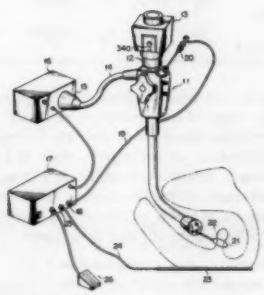
microfiche card if it bows to a position adjacent said opening.

4,487,489

ENDOSCOPIC PHOTOGRAPHING APPARATUS

Takeshi Takamatsu, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jan. 4, 1982, Ser. No. 336,843
Claims priority, application Japan, Jan. 14, 1981, 56-4288
Int. Cl.³ G03B *29/00*; A61B *1/04, 17/36*
U.S. Cl. 354—62 **6 Claims**



1. An endoscopic photographing apparatus comprising:

an endoscope having an eyepiece section;

a camera mounted on the eyepiece section of the endoscope;

a light supply unit for emitting light for illuminating a foreground subject through said endoscope;

a medical electronic device connected to said endoscope for generating a high frequency current causing consequential noise components during operation of same for medical purposes;

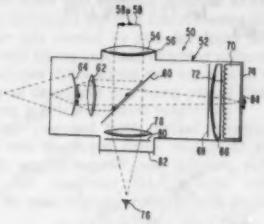
means for detecting the start of a photographing operation period of said camera to produce an output; and and means for stopping the generation of output of the high frequency current of said medical electronic device at least for the period of the photographing operation in response to the detection of the start of the photographing operation.

4,487,490

INSTANTANEOUS THREE-DIMENSIONAL CAMERA

William J. McKee, 1333 Carterwood Pl., San Jose, Calif. 95121

Filed Aug. 16, 1982, Ser. No. 408,405
Int. Cl.³ G03B 35/08
U.S. Cl. 354—115 3 Claims



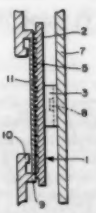
1. A camera comprising: a housing having an opening for receiving light rays emanating from an object to be photographed, said housing having a space remote from said opening for receiving a photographic film; a lenticular screen between the opening and the film-receiving space, said screen having a first, lenticulated surface and a second flat surface contiguous to said space; and a pair of mirrors in the path of the light rays from the object for forming and inverting the image of the object and for focusing the light rays onto the lenticulated surface of the screen, one of the mirrors being a beamsplitter and the other mirror being a convex mirror, whereby the light rays will be directed through said screen and onto the film when the film is in said space to result in the image of the object on the film.

4,487,491

FILM PRESSURE PLATE

Shozi Inaba, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 19, 1983, Ser. No. 486,303
Claims priority, application Japan, Apr. 28, 1982, 57-61305[U]
Int. Cl.³ G03B 17/00
U.S. Cl. 354—203 3 Claims



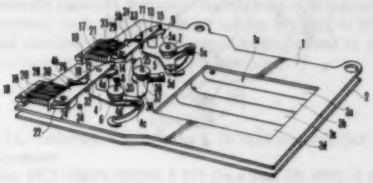
1. A film pressure plate for holding a film flat in the focal plane of a camera, comprising a plate member having a flat surface adapted to confront said film, a large number of projections formed on said flat surface and adapted to touch a said film, and leaf springs disposed at opposite sides of said plate member and tilted backward away from each other in directions away from said surface.

4,487,492

ELECTROMAGNETICALLY CONTROLLED SHUTTER

Yasuhiro Toyoda; Masayuki Suzuki, and Masayoshi Yamamichi, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 28, 1982, Ser. No. 453,941
Claims priority, application Japan, Jan. 7, 1982, 57-1492
Int. Cl.³ G03B 9/08, 9/40
U.S. Cl. 354—234.1 1 Claim



1. An electromagnetically controlled shutter for a camera, comprising:

shutter blades for opening and closing an exposure aperture of said camera;

a shutter drive member for driving said shutter blades;

magnetic means including permanent magnets and electromagnets for controlling the operation of said shutter drive member, said electromagnets being operative upon energization thereof to cancel the magnetic force of said permanent magnets;

shutter latching means for latching said shutter drive members in positions which they occupy when attracted to said magnetic means;

a pull-away spring arranged to be engageable with said shutter drive member and said shutter latching means and to be charged with a working spring force when said shutter drive member is latched by said shutter latching member, whereby when said electromagnet is energized to cancel the magnetic force of said permanent magnets, said pull-away spring moves said shutter latching means from said magnetic means to release the shutter, and subsequently thereto, the remaining working spring force is imparted to said shutter drive member in a direction to accelerate the speed of movement of said shutter blades before said pull-away spring dissipates its working spring force; and

attracting springs urging said shutter latching means in a direction to be attracted to said magnetic means, said springs causing said latching means to be returned to the attracted position to the permanent magnet of said magnetic means at the same time when the working spring force of said pull-away spring has been dissipated.

4,487,493

ELECTROMAGNETICALLY DRIVEN SHUTTER

Hideo Ikari, and Michio Hirohata, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 402,601, Jul. 28, 1982, abandoned. This application Apr. 4, 1984, Ser. No. 596,569
Claims priority, application Japan, Aug. 3, 1981, 56-121571; Aug. 5, 1981, 56-122616; Aug. 7, 1981, 56-124539
Int. Cl.³ G03B 9/08
U.S. Cl. 354—234.1 9 Claims

1. An electromagnetically driven shutter assembly for a camera comprising:

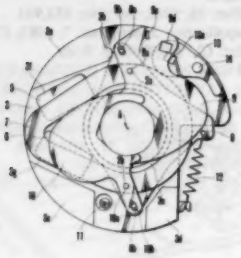
shutter blade members adapted to be actuated to open and close a film exposure aperture in a camera;

magnets forming magnetic fields;

electrical coil means arranged in said magnetic fields adapted to be electrically energized for producing electromagnetic force; and

a driving member connected with said shutter blade mem-

bers adapted to rotate about a center of rotation in response to said electromagnetic force to actuate said shutter blade members;



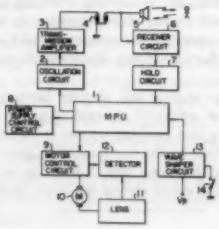
said electrical coil means and said driving members each having, respectively, a center of inertia located eccentrically relative to said center of rotation on opposite sides thereof.

4,487,494

AUTOMATIC FOCUSING APPARATUS USING ULTRASONIC WAVE

Katsuji Ishikawa, Higashiosaka, Japan, assignor to West Electric Co., Ltd., Osaka, Japan

Filed May 12, 1983, Ser. No. 494,026
Claims priority, application Japan, May 14, 1982, 57-81965
Int. Cl.³ G03B *3/10*
U.S. Cl. 354—401 **6 Claims**



1. An automatic focusing apparatus using an ultrasonic wave wherein the ultrasonic wave generated from an ultrasonic wave generator is transmitted to an object, the distance to the object is measured by receiving an echo therefrom, and a motor is driven to rotate on the basis of distance measurement data so as to axially move a lens for focal point adjustment, said apparatus comprising:

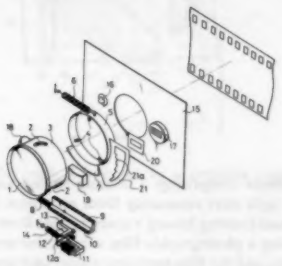
a microprocessor unit comprising first means for performing a measurement of a distance to the object by plural times and storing a plurality of distance measurement data, second means for comprising each of the plurality of distance measurement data with each remaining data, third means for determining whether resultant data of the comparison is effective, and fourth means for employing data determined by said third means to be effective as distance measurement data for focal point adjustment of said lens.

4,487,495

AUTOMATIC FOCUSING CAMERA

Hiroshi Kimata, and Masaaki Morizumi, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 30, 1982, Ser. No. 454,713
Claims priority, application Japan, Jan. 12, 1982, 57-3134
Int. Cl.³ G03B *3/10*
U.S. Cl. 354—403 **8 Claims**



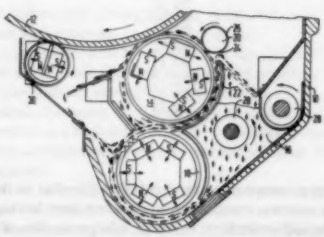
1. An automatic focusing camera comprising an active optical object distance detecting means having a light emitting element for transmitting light to an object and a light receiving element spaced apart from said emitting element for receiving the reflected light from an object, and camera lens driving means for moving a camera lens in accordance with the detected object distance, rotating means located outside of and circumferentially about the optical axis of the camera lens which rotates and which has scanning means cooperating with said light receiving element to detect the peak amount of light received from said transmitting element and thereby determine the object distance as a function of an angular displacement of the rotating means.

4,487,496

DEVICE FOR ADJUSTING THE LEVEL OF A DEVELOPING MIXTURE, WHICH CONSISTS OF A TONER AND CARRIER PARTICLES, ON A DEVELOPING ROLLER

Erich Baier, Suenzhausen; Rainer Köefferlein, Munich, and Bernhard Schlageter, Ottobrunn, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed May 6, 1982, Ser. No. 375,457
Claims priority, application Fed. Rep. of Germany, May 13, 1981, 3118995
Int. Cl.³ G03G *15/09*
U.S. Cl. 355—3 DD **5 Claims**



1. In a developer station having a housing containing a rotary developer drum for conducting developer mix, including toner and carrier particles, from a lower region of said

housing to an inking gap between said developer drum and a charge image carrier passing through said station for developing charge images generated on said carrier, apparatus for setting the layer of developer mix on said developer drum being passed to said inking gap comprising:

a stripping roller mounted for constant speed rotation in a direction corresponding to the direction of rotation of said developer drum and disposed adjacent to said developer drum for defining a nip area therebetween through which developer mix carried by said developer drum passes in route to said inking gap, said stripping roller coacting with said developer drum across said nip area to uniformly set the layer of developer mix being passed therebetween to said inking gap at a constant height and

a guide plate disposed beneath said stripping roller and adjacent said developer drum, said guide plate having a lead edge spaced beneath said stripping roller by a gap opening for receiving therethrough developer mix stripped by said stripping roller in said nip area.

4,487,497

OPTICAL DEVICE IN VARIABLE MAGNIFICATION ELECTROSTATIC COPYING APPARATUS

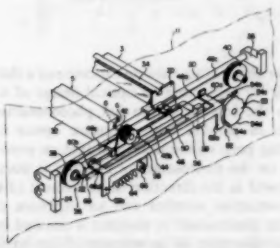
Hiroshi Kimura, Habikino; Masahiko Hisajima, Osaka; Kiyoshi Morimoto, Osaka; Kiyoshi Shibata, Osaka; Takashi Nagashima, Sakai; Yasuhiko Yoshikawa; Masahiro Watashi, both of Ikoma; Kiyonori Yamamoto, Neyagawa; Toshihiko Yamamoto, Takaishi, and Shinsuke Yoshinaga, Sakai, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Sep. 29, 1982, Ser. No. 432,101

Claims priority, application Japan, Nov. 30, 1981, 56-192394

Int. Cl.³ G03G *15/28*

U.S. Cl. 355—8 **4 Claims**



1. For use in a variable magnification electrostatic copying apparatus, an optical device comprising:

a first reflecting mirror assembly mounted for reciprocal movement along a stationary transparent plate on which is to be placed a document to be copied, said first reflecting mirror assembly adapted to be moved at a predetermined speed selected according to a selected copying magnification;

a second reflecting mirror assembly mounted for reciprocal movement substantially parallel to the reciprocating direction of said first reflecting mirror assembly;

a speed-reduction interlocking mechanism means for moving said second reflecting mirror assembly at a speed equal to one-half of the moving speed of said first reflecting mirror assembly according to the movement of said first reflecting mirror assembly, said mechanism means including a pair of stationary pulleys mounted rotatably in spaced-apart relationship in the reciprocating direction of said first and second reflecting mirror assemblies, a movable pulley mounted rotatably on said second reflecting mirror assembly, and a cable wrapped about said pair of stationary pulleys and said movable pulley and fixed to said first reflecting mirror assembly; and

a magnification setting mechanism means for changing the relative position of said second reflecting mirror assembly with respect to said first reflecting mirror assembly according to the magnification value, said magnification setting mechanism means including a setting cam having a plurality of acting portions corresponding to a plurality of magnification values, and a setting member mounted for movement substantially parallel to the reciprocating direction of said first and second reflecting mirror assemblies and adapted to be held by said setting cam at any one of a plurality of setting positions corresponding to said plurality of magnification values, opposite free end portions of said cable of said reduction interlocking mechanism means being wrapped over said movable pulley in mutually opposite directions and then fixed to said setting member, such that when said setting member is moved said movable pulley is correspondingly moved to move said second reflecting mirror assembly.

4,487,498

COPIER

Bernd M. Guderley, Vogesenring 1, D-7813 Staufen, Fed. Rep. of Germany

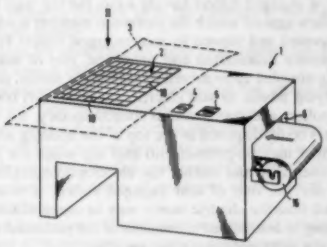
PCT No. PCT/DE81/00090, § 371 Date Jun. 28, 1982, § 102(e) Date Jun. 28, 1982, PCT Pub. No. WO 82/01597, PCT Pub. Date May 13, 1982

This PCT application filed Jun. 13, 1981, Ser. No. 394,921

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1980, 3041037

Int. Cl.³ G03G *15/00*

U.S. Cl. 355—14 R **20 Claims**



1. A copier, particularly for copying documents, drawings and the like onto paper, said copier comprising:

(a) a transparent support for supporting an original which is to be copied and is capable of being transilluminated;

(b) illuminating means for illuminating the original prior to and during copying, said illuminating means including at least one illumination source capable of transilluminating the original while the latter is on said support so as to permit the original to be aligned prior to copying; and

(c) activating means for said illuminating means designed to permit transillumination of the original on said support while copying of the original is inhibited.

4,487,499

SYNCHRONIZED DOCUMENT FEED FOR ELECTROPHOTOGRAPHIC IMAGING COPIER APPARATUS

Lionel B. Hoffman, Wyckoff, N.J., assignor to Tetras, S.A., Paris, France

Division of Ser. No. 313,948, Oct. 23, 1981, Pat. No. 4,415,263. This application Aug. 22, 1983, Ser. No. 525,614

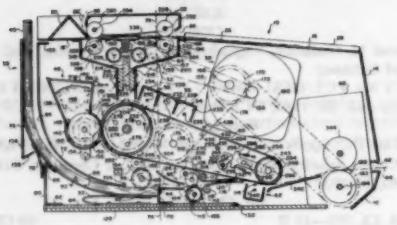
Int. Cl.³ G03G *15/00*

U.S. Cl. 355—14 SH **3 Claims**

1. In an electrostatic copying machine which includes a housing having top and bottom walls, side walls, a front and rear wall; an imaging system within the housing including a rotary electrophotographic member, rotary means supporting the said electrophotographic member to rotate in a defined geometric endless path, drive means including an electric motor for moving the said electrophotographic member in a predetermined direction along said path, means for charging

progressive areas of the electrophotographic member, means for selectively discharging the electrophotographic member progressively to apply a latent image thereon and including means progressively illuminating and projecting the pattern of an original patterned member to the progressively charged areas of the electrophotographic member; means for toning the latent image progressively; means for progressively transferring the toned image to a carrier medium sheet moving synchroniously with said electrophotographic member; and means for moving the sheet after transfer out of the front wall of the housing, the invention herein which comprises:

means for moving a patterned member along the top wall of the copying machine in synchronism with the movement of said rotary electrophotographic member comprising a



pair of engaged rollers having a nip, the top wall having a window against which the patterned member is adapted to be pressed and moved by said engaged rollers to be progressively illuminated and projected, one of said rollers being coupled to be driven by said drive means, means for applying power to said electric motor to start rotation of the rollers and rotary means simultaneously, the engaged rollers being disposed at the top of the housing whereby a member may be pressed into said nip while the motor is not energized and neither the electrophotographic member nor the one of said engaged rollers is rotating, at which time the electric motor may be energized manually causing synchronized movement of the patterned member and the electrophotographic member.

4,487,500

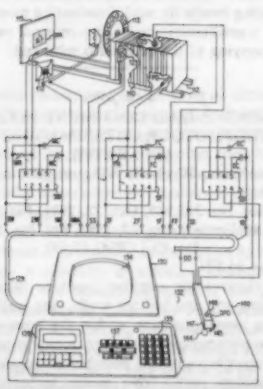
PHOTOGRAPHIC REPRODUCTION SYSTEM

Clarence S. Ost, Margate City, N.J., assignor to Electronic Mechanical Products Co., Atlantic City, N.J.

Filed Mar. 29, 1982, Ser. No. 363,070

Int. Cl.³ G03B *13/28*

U.S. Cl. 355—44 **17 Claims**



1. In a computer-assisted system of photographic reproduction, wherein a human operator causes densitometric and related data to be supplied to apparatus adapted to process such data and to determine exposures therefrom, the improvement comprising retrievably storing and displaying some such data and related information derived therefrom to the operator at selected steps in the overall data processing and exposure determination procedure, wherein densitometric data from calibration of densitometer response against a standardized grey scale and densitometric data subsequently obtained from non-standard copy are displayed to the operator upon demand, whereas exposure data for such copy calculated from densitometric data so obtained are displayed to the operator automatically

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4,487,501

PROCESS OF EXPOSING PHOTOSENSITIVE MEMBER

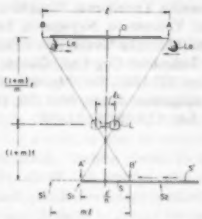
Shigeru Suzuki; Yutaka Koizumi; Nobuyuki Yanagawa; Koji Hirakura, all of Kanagawa, and Chikara Imai, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Japan

Filed Jun. 1, 1982, Ser. No. 384,061

Claims priority, application Japan, Jun. 1, 1981, 56-084182

Int. Cl.³ G03B *27/48, 27/50*

U.S. Cl. 355—50 **14 Claims**



1. A process of effecting slitwise exposure of a flat photosensitive member by projecting an optical image of a stationary original onto the surface of the flat photosensitive member which moves in parallel with exposure optics including a parallel moving part; characterized in that an exposure initiation location on the photosensitive member is situated downstream as viewed in the direction of movement of the surface of the photosensitive member and an exposure termination location on the photosensitive member is situated upstream as viewed in the direction of movement of the surface of the photosensitive member, an image location moving from the exposure initiation to the exposure termination location within the space of a copying arrangement, wherein a copying magnification can be selected by the speed ratio between the photosensitive member and the movable part.

4,487,502

MODEL EO 1000 MULTISPECTRAL COMPUTERIZED LENS EVALUATION STATION

Louis R. Fantozzi, Massapequa; Lawrence Kessler, Bethpage, and Richard Draxler, West Babylon, all of N.Y., assignors to Diversified Optical Corporation, Farmingdale, N.Y.

Filed Apr. 2, 1979, Ser. No. 26,445

Int. Cl.³ G01B *9/00*

U.S. Cl. 356—125 **4 Claims**

1. Apparatus for determining the optimum focal plane of an infrared lens comprising:

an infrared energy source and means for modulating the same;

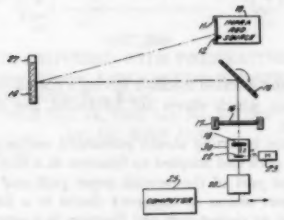
a collimating lens;

means for directing energy from said infrared energy source to said collimating lens;

a folding mirror;

said energy being directed from said collimating lens to said folding mirror;

an infrared detector;
said energy being directed from said folding mirror to said detector;
a computer;
said detector being connected to the input of said computer;
a platform;
and an infrared lens holder mounted between said folding mirror and said platform; said folding mirror being for directing said energy through a selected portion of an infrared lens mounted in said lens holder;
said platform being movable toward and away from said lens holder and also being movable parallel to said lens holder;
a knife edge shutter mounted on said platform for movement transversely to the path of energy from said infrared lens in said lens holder to said detector;
means for stepping said shutter in a series of steps across the path of infrared energy from said lens in said lens holder under control of said computer;
and means for moving said platform to selected positions toward and away from said lens in said lens holder under control of said computer;
said detector transmitting the successive energy levels for each position of said shutter at each position of said platform to said computer;
said computer being operable for controlling said means for moving said platform to move said platform successively



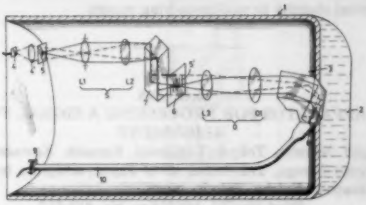
to a plurality of successive platform positions each within the range of the depth of focus of said lens and each within a respective focal plane of said lens in said lens holder, said computer further being operable when said platform is at each of said successive positions for controlling said means for stepping said shutter to step said shutter across said respective focal plane; said computer being further operable for providing a read out of said successive energy levels at each of said successive positions;
said computer being further operable for moving said platform to first, second and third ones of said successive platform positions, for stepping said shutter and for providing a read out at each of said positions; said computer being further operable for moving said platform to a fourth position between the two adjacent positions of the first, second and third positions having the higher energy level read outs, for stepping said shutter and for providing a read out at said fourth position;
and an additional infrared energy sensor in the path of energy from said energy source;
said additional infrared energy sensor detecting variations in the energy from said energy source and being connected to said computer to provide a normalizing signal for said computer to vary the usable input signal from said detector in said computer to a level, for each operation, which starts from the same base.

4,487,503

REFRACTOMETER USING THE LIMITING ANGLE METHOD

Benoit Grandjacques, Maisons Alfort; Jacques Moirez, Paris; Michel Saint-Sevin, Gagny; Michel Blot, Arpajon, and Jean-Michel Baluteau, Livry Gargan, all of France, assignors to Sopelem, Levallois-Perret, France

Filed Nov. 6, 1981, Ser. No. 318,905
Claims priority, application France, Nov. 14, 1980, 80 24244
Int. Cl.³ G01N *21/43*
U.S. Cl. 356—136 **7 Claims**



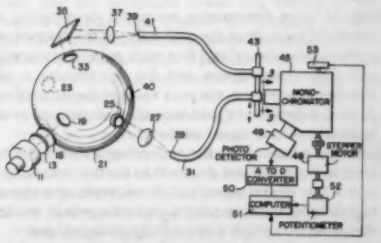
1. Refractometer for measuring the refractive index of a medium, using the limiting angle method, comprising
(a) a reference prism having an exit face and a known refractive index, in contact with the medium to be observed;
(b) a light source;
(c) a lens for directing all light rays emanating from said light source onto said prism;
(d) a photoelectric cell for measuring the image formed at said exit face of said prism;
(e) an apparatus for interpreting signals received by said cell;
(f) a grille fixed perpendicular to the optical axis and having a plurality of parallel and regularly spaced slits corresponding to an angle of incidence of an optical beam on said prism;
(g) said light source illuminating a source slit wich has as its image with respect to an optical system one of said parallel slits in said grille;
(h) means being provided so that the image of said source slit on said grille can be successively each of said parallel slits of said grille;
(i) a pupil located in the image plane of said light source and conjugate with said exit face of said prism.

4,487,504

REFLECTANCE MEASURING INSTRUMENT WITH INTEGRATING SPHERE

Herbert Goldsmith, Rockville, Md., assignor to Pacific Scientific Instruments Company, Anaheim, Calif.

Filed Sep. 1, 1982, Ser. No. 417,346
Int. Cl.³ G01J *3/42*; G01N *21/47*
U.S. Cl. 356—323 **15 Claims**



1. A reflectance measurement instrument comprising an

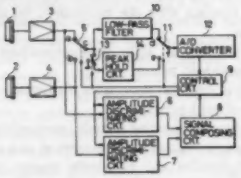
integrating sphere having means to introduce light into said sphere and defining a sample port to receive a sample, a sample beam exit port to receive light reflected from a sample positioned at said sample port, and a reference beam exit port positioned to receive light reflected from the interior wall of said sphere, measuring means to make quantitative measurements on received light intensity, a first fiber optic cable arranged to receive light transmitted through said sample beam exit port, a second fiber optic cable arranged to receive light transmitted through said reference beam exit port, and beam switching means operable to selectively position said first fiber optic cable or said second fiber optic cable to transmit the light received thereby to said measuring means.

4,487,505

APPARATUS FOR PROCESSING A SIGNAL FOR ALIGNMENT

Shigeki Nakano, Tokyo; Yasuyoshi Yamada, Kawasaki, and Ryozo Hiraga, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 17, 1982, Ser. No. 419,512
Claims priority, application Japan, Sep. 24, 1981, 56-151531
Int. Cl.³ G02B *21/06*; G01B *11/00*
U.S. Cl. 356—400 **6 Claims**



1. A signal processing apparatus usable with a first object having at least one first mark pattern and a second object having at least one second mark pattern thereon, said apparatus comprising:

first sensing means for sensing said first mark pattern and putting out a first signal strem containing a desirable signal portion indicative of said first mark pattwern and an undesirable signal portion indicative of information unavoidably sensed by said first sensing means;

second sensing means for sensing said second mark pattern and putting out a second signal stream containing a desirable signal portion indicative of said second mark pattern and an undesirable signal portion indicative of information unavoidably sensed by said second sensing means;

extracting means for extracting said desirable signal portion indicative of said first mark pattern from said first signal stream and for extracting said desirable signal portion indicative of said second mark pattern from said second signal stream;

threshold value determining means for determining a first threshold value from the peak value of the desirable signal portion indicative of said first mark pattern extracted from said first signal stream and for determining a second threshold value from the peak value of the desirable signal portion indicative of said second mark pattern extracted from said second signal stream;

signal converting means for converting a signal of a higher level in the first signal stream than the first threshold value into a first digital signal and for converting a signal of a higher level in the second signal stream than the second threshold value into a second digital signal; and

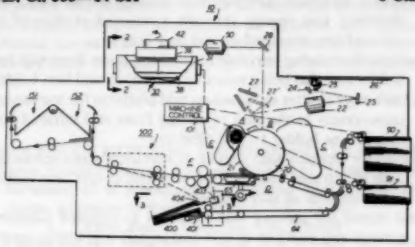
signal composing means for composing the first digital signal and the second digital signal.

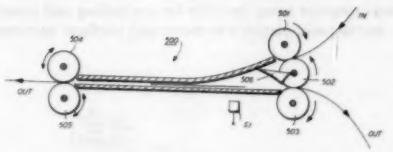
4,487,506

REVERSING ROLL INVERTER WITH BYPASS CAPABILITY

Thomas J. Repp, Penfield, and Robert P. Rebres, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 23, 1982, Ser. No. 410,202
Int. Cl.³ B65H *1/24, 29/60*; G03B *27/32, 27/62*
U.S. Cl. 355—14 SH **8 Claims**





1. In a reproduction machine having a normal paper path of travel along which sheets are advanced, the improvement comprising:

dual mode inverting means positioned within said normal paper path and adapted to function in a first mode as an integral part of the normal paper path and serves as a transport means to transport sheets in a first direction toward an output area and function in a second mode to reverse said first direction of the sheets and forward them for further processing before they exit said inverting means in said first direction, and wherein said dual mode inverting means includes a pair of reversible rolls positioned within said normal paper path downstream from tri-roll input and output nips formed by two driven rolls positioned adjacent to and in contact with an idler roll, said reversible rolls have a uniform surface and are adapted to forward sheets in either a forward or reverse direction.

4,487,507

PORTABLE WASTE PROCESSING UNIT

George Van Wyngaarden, London, Canada, assignor to London Machinery Company Limited, London, Canada

Filed Oct. 26, 1983, Ser. No. 545,455
Int. Cl.³ B28C *7/00, 7/04*
U.S. Cl. 366—20 **1 Claim**

1. A processing apparatus for sludge and liquid waste comprising:

a wheeled vehicle having a frame;

a drum type mixer mounted for rotation on said frame;

motive power means including a hydraulic pump;

a hydraulic motor for rotating said drum type mixer mounted on said frame operable in response to output from said hydraulic pump;

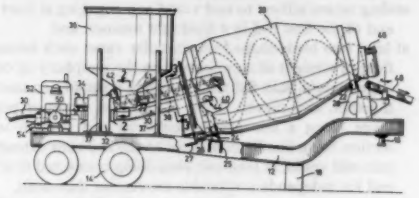
waste feed means mounted on said frame;

a hydraulic motor for said waste feed means on said frame operable in response to the output of said pump for feeding waste into the input end of said mixer;

storage means on said frame for storing a supply of processing agent for said waste;

processing agent feed supply means on said frame a hydraulic motor for said processing agent feed means on said frame operable in response to output of said pump for feeding processing agents from said storage means to said mixer;

delivery means mounted on said frame for delivering output



from said drum type mixer for conveyance to a remote location;

valve control means for supplying output of said pump to said hydraulic motor for said waste feed means;

valve control means for supplying output of said pump to said hydraulic motor for said processing agent feeding means;

valve control means for supplying output of said pump to said hydraulic motor for said drum type mixer.

4,487,508

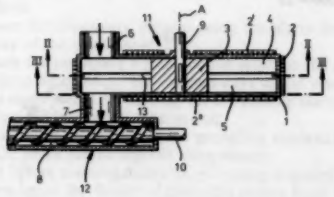
EXTRUDER PROVIDED WITH PREHEATING STAGE

Heinz Ratheiser, Vienna, Austria, assignor to American Maplan Corporation, McPherson, Kans.

Filed Dec. 14, 1983, Ser. No. 561,583

Int. Cl.³ B29B 3/00

U.S. Cl. 366—91 **6 Claims**



1. In an extruder having a housing forming a mastication stage provided with feedscrew means for shaping a flowable polymeric material into a coherent article, said mastication stage communicating with a passage supplying said polymeric material to said feedscrew means, the combination therewith of a preheating and premixing chamber bounded by horizontal top and bottom walls and by a peripheral wall, said chamber being provided with external heating means, an upper wheel and a lower wheel juxtaposed in said chamber and centered on a common vertical axis, and drive means for jointly rotating said wheels about said axis, said top and bottom walls being respectively provided with an inlet port and an outlet port forming part of said passage, said upper wheel having a set of first raker arms sweeping the interior of said chamber adjacent said top wall and in the area of said inlet port with an off-radial orientation drawing incoming polymeric material toward said axis, said lower wheel having a set of second raker arms sweeping the interior of said chamber adjacent said bottom wall and in the area of said outlet port with an off-radial orientation driving said polymeric material from the vicinity of said axis toward said peripheral wall for re-engagement by said first raker arms of any part of said polymeric material not discharged through said outlet port into said mastication stage.

4,487,509

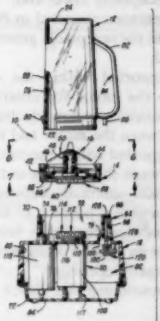
PORTABLE BLENDER

Raymond D. Boyce, 1822 Brookhaven Blvd., Norman, Okla. 73069

Filed Jan. 17, 1983, Ser. No. 458,560

Int. Cl.³ B01F 7/00, 7/16, 13/04

U.S. Cl. 366—199 **17 Claims**



1. A blender for blending materials, comprising:

a container having an upper end, a lower end and a container opening extending a distance therethrough and intersecting the upper end thereof, the container opening being shaped to receive the material to be blended through the open upper end and to retain such material to be blended generally within the container opening;

a cap removably connectable to the open upper end of the container and substantially closing the open upper end of the container when connected thereto, the cap having a cap base and a cap wall extending a distance generally about the cap base;

a support base having an upper end and a lower end, a receptacle opening being formed through the support base terminating with a receptacle lower end to form a receptacle adapted for receiving the cap with the container connected thereto, the cap being disposed generally near the receptacle lower end when the cap with the container connected thereto is disposed within the receptacle opening, and the support base having a ledge formed on the wall formed by the receptacle opening and extending circumferentially about the receptacle opening, the ledge being spaced a distance above the receptacle lower end adapted to engage the cap to limit the movement of the cap in a direction generally toward the receptacle lower end, the ledge cooperating to position the cap in the receptacle opening spaced a predetermined distance above the receptacle lower end, the support base also having a component space being formed in a portion of the support base, and the receptacle lower end having an opening formed therethrough; a mixer for blending the material, the mixer being connectable to the container and having a portion disposable within a portion of the container opening when the cap is connected to the container, and the mixer comprising:

a mixer shaft extending through a central portion of the cap base, a portion of the mixer shaft extending a distance through the space formed by the cap wall and another portion of the shaft extending a distance in the opposite direction from the cap base;

mixer blades attached to the end portion of the shaft extending through the space formed by the cap wall, the shaft extending the distance from the cap base so the blades are disposed generally within a portion of the

container opening in a connected position of the cap and the container; and

means for forming a fluid seal between the cap and the shaft;

a drive assembly having a portion removably engageable with a portion of the mixer, the drive assembly driving the mixer to blend the material in the container in a driving condition of the drive assembly, comprising:

a DC motor supported within the component space for driving the mixer when the motor is in a driving condition and comprising a drive shaft extending through the opening in the receptacle lower end;

a drive connector connected to the drive shaft and being disposed in the receptacle generally near the receptacle lower end;

batteries supported within the component space connected to the motor for conditioning the motor in a driving condition when electrical continuity is established between the motor and the batteries;

a switch supported within the component space and interposed between the batteries and the motor for establishing electrical continuity between the batteries and the motor in a closed position of the switch and for interrupting electrical continuity between the motor and the batteries in an opened position of the switch, the switch being normally opened;

means for positioning the switch in the closed position; and

a mixer connector connected to the mixer shaft, the mixer connector being removably connectable to the drive connector, the motor drivingly rotating the mixer blades in a driving condition of the motor when the mixer is connected to the motor via the connection provided via the mixer connector and the drive connector, the cap being supported on the ledge in a connected position of the drive connector and the mixer connector.

4,487,510

MIXING APPARATUS

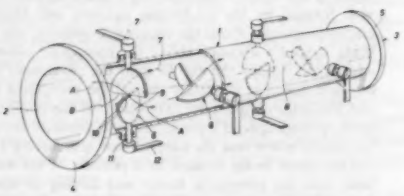
Cornelis Buurman, and Arnon Plaschkes, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 476,742, Mar. 18, 1983, abandoned. This application Mar. 19, 1984, Ser. No. 589,864

Claims priority, application United Kingdom, May 28, 1982, 8215708

Int. Cl.³ B01F *5/06*

U.S. Cl. 366—337 **9 Claims**



1. An apparatus for mixing flowing materials comprising:

an elongated vessel provided with at least one inlet means near one end of said vessel for supplying materials to be mixed, and outlet means near the other end of said vessel for discharging the said materials after mixing; and

a plurality of mixing guides inside said vessel, said mixing guides being spaced apart from each other along the longitudinal axis of said vessel, each of said guides having an axis arranged substantially perpendicular to the said longitudinal axis of said vessel, and each said guide being rotatably mounted in said vessel whereby materials flowed through the vessel are mixed by passing through and between said guides, and the pressure drop across the vessel is controlled by adjusting the angular position of said guides,

each of said mixing guides including mounting rod means having at least one rod end extending through the wall of said elongated vessel in a rotatable and fluidtight manner, the axis of the rod ends being arranged substantially perpendicular to said longitudinal axis of said vessel,

a second rod end being anchored to the wall of the vessel opposite said first rod end,

sealing means affixed to said vessel and engaging at least the end of the first rod in a fluidtight manner, and

at least two blade-shaped semicircular vanes each having a float or straight section formed on the periphery or outer edge thereof, said flat sections being rotatably connected together, the curved edges of the two vanes at points taken along a line perpendicular to said straight vane section being fixedly connected to the rod ends extending into said vessel, at least one vane being connected to a rod end for independent rotatable movement therewith,

the combined area the pair of said two vanes being less than the cross-sectional area of said vessel whereby at least one of the vanes can rotate through a complete circle within the vessel.

4,487,511

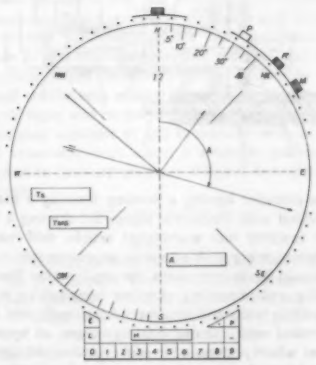
WATCH FOR THE SPACE ORIENTATION IN ADDITION TO THE TIME ORIENTATION

Giancarlo Lucarelli, via Tasso, 179, Naples, Italy 80127

Filed Mar. 15, 1982, Ser. No. 357,890

Int. Cl.³ G04B *19/26*

U.S. Cl. 368—15 **1 Claim**



1. A watch-compass useful for time and space orientation, said watch-compass comprising:

(a) a dial having two main pointers for indicating local time;

(b) a supplemental pointer located on said dial, said supplemental pointer being able to indicate on the dial an azimuth angle of a selected celestial body;

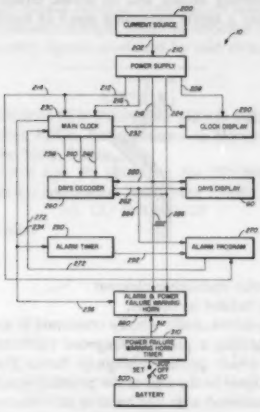
(c) a microprocessor associated with the watch and used for calculating said azimuth angle; and

(d) a keyboard attached to said watch for introducing numbers and data into said microprocessor for calculation of said azimuth angle.

4,487,512
PROGRAMMABLE ALARM CLOCK APPARATUS

I. Garth Price, 3255 Gateway, Apt. 235, Springfield, Oreg. 97477

Filed Jan. 24, 1983, Ser. No. 460,122
Int. Cl.³ G04B 9/00; G04C 21/16
U.S. Cl. 368—66 3 Claims



1. Programmable alarm clock apparatus, comprising, in combination:

clock means, including

a clock for determining time on daily, hourly, and minute basis,

display means for displaying time on an hourly and minute basis, and

display means for indicating the day of the week; alarm means, including

means for selecting an alarm time on an hour and minute basis,

means for selectively programming the alarm time on a day of the week basis,

means for providing a first audible alarm at the selected alarm time and on the selected days of the week, and

first timer means for turning off the audible alarm after a first predetermined time period;

first electrical power means for providing electrical power to the clock means and the alarm means;

power failure warning means for providing a second audible alarm upon the failure of electrical power from the first electrical power means;

second timer means for turning off the second audible alarm after a second predetermined time period; and

second electrical power means for providing electrical power to the power failure warning means and to the second timer means and to the alarm means upon failure of the first electrical power means for the second audible alarm.

4,487,513
WATCH CASE STRUCTURE

Masataka Matsumoto, Tokorozawa, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

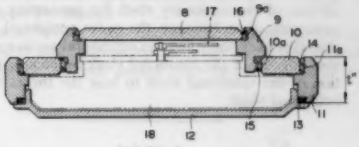
Filed Jan. 24, 1983, Ser. No. 460,603
Claims priority, application Japan, Jan. 27, 1982, 57-11345
Int. Cl.³ G04B 37/00
U.S. Cl. 368—294 9 Claims

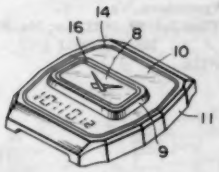
1. A watch case structure comprising:

a caseband made quite thin with respect to a total thickness of the watch;

a flat plate member fixed on the inner periphery of the upper part of said caseband and provided with an opening, said flat plate member occupying a great part of the total top area of the watch;

a bezel fixed in the inner periphery of the opening of said flat plate member; and



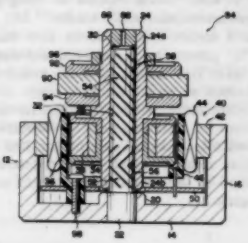


a watch galss fixed on the inner periphery of the upper part of said bezel.

4,487,514
MOTOR

Hisamitsu Mori, Yokkaichi, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Sep. 28, 1982, Ser. No. 425,993
Claims priority, application Japan, Sep. 29, 1981, 56-153051; May 14, 1982, 57-70775
Int. Cl.³ F16C 32/06
U.S. Cl. 384—113 15 Claims



1. A motor comprising:

a housing;

a stationary shaft placed upright on the housing and having an outer peripheral surface;

a rotational shaft having a cylindrical hollow portion coaxially formed with the rotational shaft, open at one end of the rotational shaft, and into which the stationary shaft is inserted, so that the rotational shaft is rotatably and coaxially supported by the stationary shaft;

a rotor mounted on the rotational shaft and rotating integrally with the rotational shaft;

a stator mounted in the housing for rotating the rotor;

a first dynamic pressure type bearing including a herringbone-shaped air groove and formed on the outer peripheral surface of the stationary shaft for generating a dy-

namic pneumatic flow between the outer peripheral surface of the stationary shaft and the peripheral surface of the hollow portion of the rotational shaft by means of the rotation of the rotational shaft to bear the radial load of the rotational shaft; and

a second dynamic pressure type bearing including a spiral-shaped air groove and formed on the outer peripheral surface of the stationary shaft for generating a dynamic pneumatic flow between the outer peripheral surface of the stationary shaft and the peripheral surface of the hollow portion of the rotational shaft by means of the rotation of the rotational shaft to bear the thrust load of the rotational shaft.

4,487,515

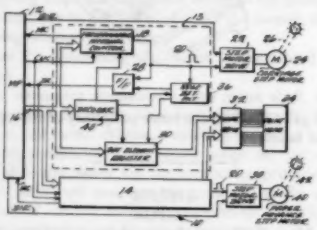
MULTIPLE ACTION PRINT HEAD CONTROL CIRCUIT FOR A DOT MATRIX PRINTER

Samuel C. Harris, Waynesboro, Va., assignor to Genicom Corporation, Waynesboro, Va.

Filed Jul. 19, 1982, Ser. No. 399,216

Int. Cl.³ B41J 3/12

U.S. Cl. 400—121 **15 Claims**



1. A dot matrix printer head control circuit capable of selectively requesting and receiving print head control data from a digital data processor which successively transmits plural sets of digital data in response to a data request signal, said control circuit comprising:

master/slave state means capable of being preset to one of plural predetermined stable states;

data request means connected to said master/slave state means for generating a data request signal only if said master/slave state means has been preset to the predetermined master stable state; and

data receiving means also connected to said master/slave state means for receiving only a predetermined one of the successive sets of digital data transmitted in response to a given data request signal, said predetermined set being determined by the preset stable state of said master/slave state means.

4,487,516

PRINTING NEEDLE APPARATUS

Rainer Kaufmann, Witts-Allee 32, D-2000 Hamburg 55, Fed. Rep. of Germany

Filed Feb. 24, 1983, Ser. No. 469,157

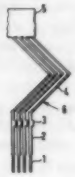
Claims priority, application Fed. Rep. of Germany, Feb. 27, 1982, 3207195

Int. Cl.³ B41J 3/12

U.S. Cl. 400—124 **7 Claims**

1. Needle printing apparatus comprising a row of printing needles that have respective axes which are parallel to one another and are all contained substantially in a single plane, each said needle having a tip at a front end thereof and being movable lengthwise forwardly from a normal position in response to a forward force upon it, for engagement of its tip against a recording medium, a yielding stroke equalizing element for each printing needle through which forward force is applied to it and whereby confinement of the needle against forward motion is prevented from interfering wiht the application of forward force to the other needles, and a controllable blocking device for each needle, normally in a relaeasing condition permitting lengthwise forward movement of the needle but energizable to a blocking condition confining the needle against forward motion in response to said force, said needle printing apparatus being characterized by:

A. each printing needle and its stroke equalizing element comprising a single elongated piece of resilient material; and



B. each stroke equalizing element

(1) being behind its needle,

(2) being substantially wholly contained in said plane, and

(3) comprising a pair of elongated portions of said one piece which project obliquely forwardly at opposite inclinations to the axis of the printing needle and which are connected with one another at a substantially sharp-angled junction to have a substantially zigzag form.

4,487,517

PRINTER ADAPTED TO PERFORM MARGIN/TABULATOR SETTING FUNCTION

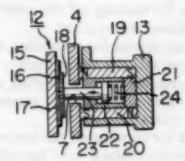
Toshiaki Ozawa, Urayasu; Yasuaki Yamada, Funabashi, and Hiroatsu Kondo, Zushi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 138,982, Apr. 10, 1980, abandoned. This application Sep. 30, 1982, Ser. No. 431,065

Claims priority, application Japan, Apr. 27, 1979, 54-52990; Apr. 27, 1979, 54-52991; Jul. 5, 1979, 54-84391

Int. Cl.³ B41J 21/02

U.S. Cl. 400—279 **9 Claims**



1. An electronic apparatus providing a margin and/or tabulator setting function, comprising:

printing means;

a carriage carrying said printing means;

carriage displacement means for initiating displacement of said carriage in response to entry of an instruction thereto and for stopping displacement of said carriage in response to a stop signal thereto; and

tabulator/margin setting means, connected to said carriage displacement means, for generating stop signals to stop carriage displacement initiated by said displacement means at desired stop positions, said tabulator/margin setting means comprising a group of switches for setting said desired stop positions of said carriage, said group of switches comprising a printed circuit board having a plurality of open circuit patterns each corresponding respectively to a said desired stop position of said carriage, a pressure-sensitive electroconductive member adhered to

said printed circuit board to cover said open circuit patterns, and at least one tabulator/margin setting resilient member mountable for selectively pressurizing an area of said pressure-sensitive electroconductive member corresponding to one said open circuit pattern at a desired stop position to thereby close said circuit pattern and produce a stop signal indicative thereof;

wherein said carriage, when displaced in response to an instruction to said carriage displacement means, is stopped at said tabulator/margin positions selected in accordance with the stop signals produced by said switches.

4,487,518

ADJUSTABLE PRINTER HEAD DRIVE

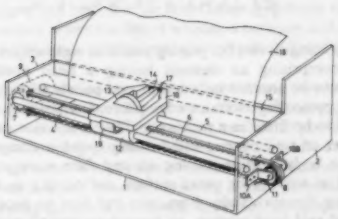
Ferruccio Earini, Milan, Italy, assignor to Honeywell Information Systems Italia, Milan, Italy

Filed Apr. 29, 1982, Ser. No. 372,908

Claims priority, application Italy, May 7, 1981, 21538 A/81

Int. Cl.³ B41J *25/28*

U.S. Cl. 400—320 **1 Claim**



1. In combination with a serial printer an adjustable diameter pulley for adjusting belt tension in a belt transmission system which moves a printing head along a printing line comprising:

a plastic cylinder having a tapered longitudinal internal surface, a cylindrical external surface acting as a winding surface for a belt and two flat sides perpendicular to said cylindrical surface, said cylinder further having a plurality of longitudinal slits partially extending alternately from either longitudinal end of said cylinder:

a core provided with a tapered portion inserted in said cylinder, said core further having a threaded portion extending longitudinally;

positioning means for positioning said plastic cylinder on said core, said positioning means comprising an annular ring having its internal surface threaded, said annular ring engaging said threaded portion of said core and being capable of longitudinal motion when screwed on said threaded portion; whereby said positioning means contacts one end of said cylinder urging said cylinder in a longitudinal direction, thus radially expanding the cylindrical external surface of said plastic cylinder whereby the belt tension in the belt transmission system which moves a printing head along the printing line is appropriately adjusted.

4,487,519

APPARATUS FOR PRINTING ON RECEIPT FORMS OR THE LIKE

Wolfgang Rubey; Günter Baitz; Wolfgang Malke, and Harald Noack, all of Berlin, Fed. Rep. of Germany, assignors to Nixdorf Computer AG, Fed. Rep. of Germany

Filed Sep. 30, 1982, Ser. No. 430,544

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1981, 3147415

Int. Cl.³ B41J *13/22*

U.S. Cl. 400—534 **5 Claims**

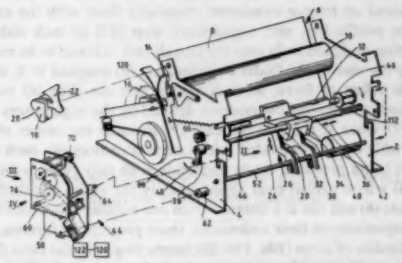
1. Apparatus for receiving, holding and bidirectionally feeding documents relative to a printer, comprising:

slide means mounted for directional lineal motion relative to the printer; said slide means having a rack portion thereon;

document-clamping means on said slide means for receiving, clamping and releasing documents therein; said document-clamping means comprising a rigid clamp portion which engages the documents and a resilient spring arm which carries the rigid clamp portion;

rotatable power means;

gear means having teeth mechanically engaging the rack portion of said slide means and rotatable in one direction to advance the slide means from an initial position to a



drawn-in position and in the other direction to return the slide means to the initial position;

the document-clamping means including a pin mounted in said rack portion for displacement at right angles thereto and bearing against the spring arm and being arranged to be displaced by the engagement of a tooth of said gear means with said pin to release documents at one of said positions and to grip documents at other positions;

and drive means mechanically interconnecting said power means with said gear means for converting rotation of said drive means into bidirectional rotation of said gear means.

4,487,520

FOLDER

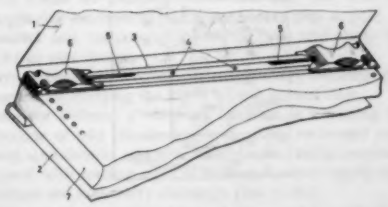
Horst-Werner Maier-Hunke, Iserlohn; Werner H. G. Pfannkuch, Hemer, and Friedrich Vieler, Iserlohn-Sümmern, all of Fed. Rep. of Germany, assignors to Hunke & Jochheim, Iserlohn, Fed. Rep. of Germany

Filed Nov. 23, 1981, Ser. No. 324,036

Claims priority, application Fed. Rep. of Germany, Dec. 2, 1980, 3045815; Dec. 2, 1980, 3045816; Feb. 20, 1981, 3107093; Mar. 13, 1981, 3110551

Int. Cl.³ B42F *13/36, 13/06, 13/00*; B42D *5/00*

U.S. Cl. 402—65 **16 Claims**



1. Folder for receiving documentary material, especially tabulating paper, with two covers, at least one of which is provided in the region of the folder spine with a profile bar which has a trough part with insertion orifices for thread-on wires serving to retain the documentary material and onto which slides for firmly clamping the thread-on wires can be clipped, these slides having front and rear ends and a guide

partially surrounding the profile bar, each slide being made hook-like at one end, the profile bar being provided in its trough part at each bar end with at least one cam (9) which interacts with a plurality of stops (19a, 19b, 20) on each slide including at least a first stop (20) to counteract the pulling-off of the slides from the profile bar, and at least a second stop (19a, 19b) to determine the position of the slides in a hanging position in which their hook-like ends project beyond the ends of the profile bar, there being provided on the slide at least one further stop which is an engagement stop (17) extending from the rear end of the slide for engaging the cam (9) for defining the position of the slide in a filing position in which the rear end of the slide pushed from the bar end onto the particular thread-on tongue terminates essentially flush with the end of the profile bar, said engagement stop (17) of each slide (6) being designed to fit into the trough part (12) and to be moved by the user of the folder over the cam (9) assigned to it, under the effect of force, in such a way that the slide (6) can be displaced beyond the position defined by the engagement stop (17) when it engages the cam (9) towards the center of the profile bar (3), provided with insertion orifices (4), each slide (6) being provided on its underside with two guide webs (25, 26) which extend over approximately the entire length of the slide (6) and run at a distance from one another and which have projections on their undersides, these projections forming said plurality of stops (19a, 19b, 20) interacting with the cams (9) of the profile bar (3), said folder including essentially V-shaped profile bar margins and said profile bar having a cut edge (10) defined on its bottom section, said cut edge forming in the vicinity of the essentially V-shaped profile-bar margins, shoulders (15, 16) which slope down towards the bottom of the profile bar.

4,487,521

APPARATUS FOR SECURING EXPANDABLE PARTS TO SUPPORTING DEVICES

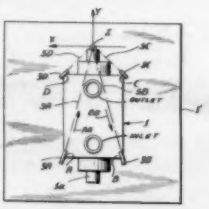
Klaus Fischer, Neustadt, Fed. Rep. of Germany, assignor to Klein, Schanzlin & Becker AG, Frankenthal, Fed. Rep. of Germany

Filed Feb. 18, 1982, Ser. No. 350,106

Claims priority, application Fed. Rep. of Germany, Feb. 21, 1981, 3106467

Int. Cl.³ F16D *1/00*

U.S. Cl. 403—24 **11 Claims**



1. The combination of a first part which is subject to expansion and contraction and resultant shifting relative to a fixed reference point and has at least three spaced-apart portions movable relative to said reference point along mutually inclined paths intersecting each other at least close to said reference point; and a second part including guide means for said portions, said guide means being arranged to permit said portions of said first part to move along the respective paths.

4,487,522

JOINING DEVICE

Robert H. Appleby, Gerrards Cross, and Peter L. Cove, London, both of England, assignors to Titus Tool Company Limited, Great Britain

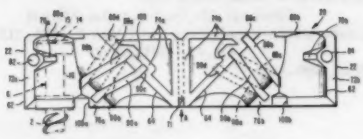
Continuation of Ser. No. 96,544, Nov. 21, 1979, Pat. No. 4,341,485, which is a continuation-in-part of Ser. No. 52,940, Jun. 28, 1979, abandoned. This application May 18, 1982, Ser. No. 379,303

Claims priority, application United Kingdom, Nov. 24, 1978, 46048/78; Oct. 19, 1979, 7936286

The portion of the term of this patent subsequent to Jul. 27, 1999, has been disclaimed.

Int. Cl.³ F16B *9/02*

U.S. Cl. 403—231 **2 Claims**



1. A joining device for joining panels at right angles to each other, comprising an element having a head portion and adapted to be secured into one of said panels with said head portion projecting from an edge thereof, a holding member adapted to be fitted in a recess provided in a major surface of the other of said panels, said holding member comprising a plug-like body portion having an end face arranged to be exposed at said major panel surface and having an opening extending therein axially from said end face to receive and surround said head portion, an inward projection within said opening located and dimensioned so that at least a part of said head portion can initially be inserted into said opening in a direction substantially parallel to the axis of said element and thereafter be further inserted into said opening past said projection to engage said projection therebehind, and a securing member located within said body portion and adjacent to said opening, said securing member being operable from said end face and effective when operated to engage said head portion from one side thereof to apply a force directly thereto in a manner to draw said head portion inwardly relative to said opening to tighten the joint formed by said panels, said inward projection engaging said head portion from the other side thereof.

4,487,523

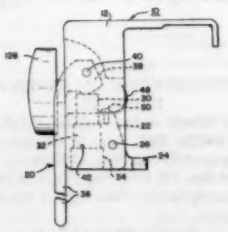
ACCESSORY CLAMP FOR ABDUCTOR BAR

Lawrence S. Monroe, Erie, Pa., assignor to American Sterilizer Company, Erie, Pa.

Filed Dec. 31, 1981, Ser. No. 336,052

Int. Cl.³ F16B *2/18*

U.S. Cl. 403—385 **7 Claims**



1. A clamp which can be releasably secured to an elongated object comprising:

a frame defining a first clamping member;

a movable member which defines a second clamping member secured to said frame for movement relative to said frame, said movable member including a contacting surface;

said first and second clamping members being so configured that said clamping members can be moved to an engaging position in which said clamp cannot be removed laterally from the object when the object is located between said clamping members; and

an operator, movement of said operator causing relative movement of said clamping members among an unclamped position, in which said clamp can be removed laterally from the object or in which said clamp can be moved laterally with respect to the object to locate the object generally between said clamping members, an intermediate clamping position, in which (i) said clamping members are in their engaging position and (ii) said clamp can be slid along the object to position said clamp at a desired location along the object, and a fully clamped position, in which (i) said clamping members are in their engaging position and (ii) said clamp is securely fixed to the object, when the object is located between said clamping members, to prevent said clamp from sliding along the object;

said operator defining a cam surface having two separate actuating surfaces adapted to individually engage and become seated on said contacting surface to provide two stable clamping positions of said operator, movement of said operator to a position wherein neither said actuating surface is seated on said contacting surface permitting said clamping members to assume their said unclamped position, movement of said operator to a second position wherein a first said actuating surface becomes seated on said contacting surface causing said clamping members to assume their said intermediate clamping position, and movement of said operator to a third position wherein a second said actuating surface becomes seated on said contacting surface causing said clamping members to assume their said fully clamped position.

4,487,524

METHOD AND APPARATUS OF FORMING SAND PILES FOR IMPROVING A SOFT GROUND

Masaru Shono, Toyonaka; Takahiro Kawakami, Takatsuki; Toshiyuki Matsumoto, Fujisawa; Thoru Tamura, Abiko, and Hideki Matsumoto, Matsubara, all of Japan, assignors to Fudo Construction Co., Ltd., Osaka, Japan

Filed Sep. 17, 1982, Ser. No. 419,313

Claims priority, application Japan, Sep. 22, 1981, 56-149708; Mar. 25, 1982, 57-47630

Int. Cl.[3] **E02B** *11/00*

U.S. Cl. 405—50 **6 Claims**

1. An apparatus of forming sand piles for improving a soft ground in a controlled manner, comprising:

a pipe driven into the ground and through which sand is supplied into the ground,

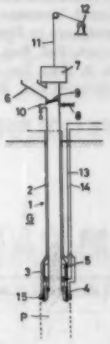
sand discharging/compacting means disposed at the lower end of said pipe for discharging the sand out of said pipe and compacting it,

a hydraulic cylinder having a piston for moving said sand discharging/compacting means vertically,

detecting means for detecting the working distance of said piston by detecting the flow rate of fluid supplied to said hydraulic cylinder,

sensor means for sensing the pressure of said fluid when the downward stroke of said piston has reached to a predetermined value,

comparing means for comparing the pushing force applied by said sand discharging/compacting means, computed based on said fluid pressure with a predetermined value, and



means for changing the diameter and/or strength of the sand piles according to the result of the comparison.

4,487,525

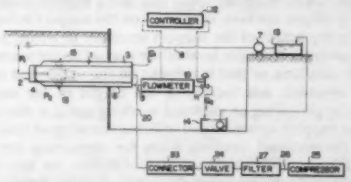
PROPULSION PIPE LAYING SYSTEM

Masami Shiotsubo, Hiratsuka; Toshikazu Yamamuro, Odawara, and Hiroshi Saito, Hiratsuka, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Aug. 18, 1983, Ser. No. 524,217

Int. Cl.[3] **F16L** *1/02*

U.S. Cl. 405—184 **8 Claims**



1. A propulsion pipe laying system including a pilot head having cutter means mounted at the leading end thereof and means for propelling said pilot head into the underground, comprising:

water supply pipe means mounted to said pilot head;

slurry discharge pipe means mounted to said pilot head;

a first tank containing water therein;

pump means for pumping water from said first tank and supplying the same to said water supply pipe means;

a second tank for receiving a slurry from said slurry discharge pipe means;

slurry conduit means connected to said slurry discharge pipe means for carrying the slurry to said second tank;

means for defining a receiving chamber in a leading end portion of said pilot head for receiving excavated earth and sand therein, said receiving chamber being communicated with leading ends of both said water supply pipe means and said slurry discharge pipe means;

flowmeter means mounted in said slurry conduit means for detecting flow rate of the slurry;

valve means disposed in said slurry conduit means for restricting flow rate of the slurry therethrough when actuated; and

a controller responsive to the flowmeter means for controlling the rate of restriction of said valve means in such a way that flow rate of the slurry becomes about equal to that of water supplied to said water supply pipe means.

4,487,526

METHOD OF AND STRUCTURE FOR ERECTING AN ARTIFICIAL ISLAND

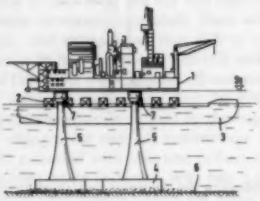
Timm Struve, and Harald Neumann, both of Hamburg, Fed. Rep. of Germany, assignors to Dyckerhoff & Widmann Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Feb. 8, 1983, Ser. No. 464,999

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1982, 3205561

Int. Cl.³ E02B *17/08;* E02D *21/00, 29/06*

U.S. Cl. 405—196 18 Claims



1. A method of erecting an artificial island at a location on the ocean floor on the high sea where the sea rises to a level above the ocean floor, with the artificial island including an upwardly extending support structure and a platform mounted on the support structure, comprising the steps of constructing the support structure of at least one of reinforced concrete and prestressed concrete, placing the support structue on the ocean floor with the upper end of the support structure located slightly above the level of the sea, transporting the platform by a float member to the location of the support structure, positioning the platform on the upper end of the support structure, after the platform has been supported on the support structure, increasing the height of the support structure to a final height spaced upwardly from the level of the sea and at the same time lifting the platform so that it remains on the upper end of the support structure, and increasing the height of the support structure by providing an enclosed working space at the upper end of the support structure and utilizing the support structure forming the enclosed working space for supporting the platform, placing prefabricated concrete members on the upper end of the support structure for increasing its height, and jacking the platform upwardly off the prefabricated concrete members.

4,487,527

SUBSEA WELLHEAD ASSEMBLY

Thomas P. Kelly, Houston, Tex., assignor to Cameron Iron Works, Inc., Houston, Tex.

Filed Aug. 19, 1982, Ser. No. 409,369

Int. Cl.³ E02D *31/00, 31/14;* E21B *33/03;* F16L *37/00*

U.S. Cl. 405—211 6 Claims

1. A subsea wellhead assembly adapted to be installed on the floor of the ocean in an area having a maximum predicted iceberg scour depth comprising

an anchor base on the floor of the ocean surrounding a well bore,

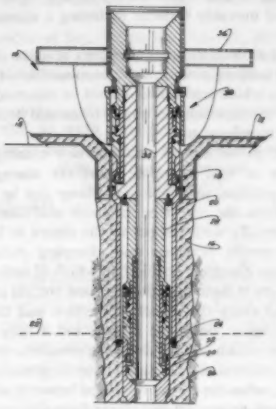
a first conductor having an upper end and a lower end, said upper end being connected to the anchor base and said lower end extending therebelow into the well bore,

said first conductor having its lower end in the well bore below the anchor base and below the maximum predicted iceberg scour depth, and

a second conductor cemented in said well bore below said first conductor and having an upper end positioned within said lower end of said first conductor,

the upper end of said second conductor being positioned below the maximum predicted iceberg scour depth,

said first conductor being cemented in said well bore with its lower end surrounding only the upper end of said second conductor and being retained in such position by the cement so that iceberg scouring of said first conductor



causes it to be disengaged from the second conductor with the upper end of the second conductor remaining in position ready for re-entry and re-connection.

4,487,528

EARTH ANCHORING EXPANSION BODY HAVING FOLDED SHEET METAL CASING

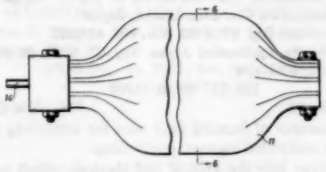
Bo T. Skogberg, Handen, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Nov. 5, 1982, Ser. No. 439,557

Claims priority, application Sweden, Nov. 16, 1981, 8106783

Int. Cl.³ E21D *20/00, 21/00*

U.S. Cl. 405—259 14 Claims



1. Expansion body for anchoring constructions in the earth, comprising:

a folded elongated sheet metal casing (11) which defines an internal closed space (15);

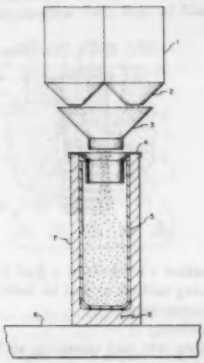
means (14) for coupling internal closed space (15) to a source of pressurized fluid for the expansion of the expansion body by the pressing out of the folds (18, 19) of the sheet metal casing under the pressure of said pressurized fluid;

said sheet metal casing comprising opposed portions (16, 17), which before said expansion have said folds (18, 19) thereof arranged in zigzag shape with the folds (18) of one of said portions (16) falling into the folds (19) of the other of said portions (17).

4,487,529
GROUTING COMPOSITION AND METHOD OF USING SAME

Donald L. Douty, Murrysville, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Jan. 7, 1982, Ser. No. 337,567
Int. Cl.³ E21D *20/02*; B65D *25/08*
U.S. Cl. 405—261 **21 Claims**



1. A method of fastening an anchor element in a hole in a support structure comprising

(a) delivering a hardenable inorganic grouting composition into the hole, said grouting composition comprising (1) a dry inorganic cement powder, (2) liquid containing capsules, and wherein said liquid is reactive with said inorganic cement and wherein said capsules are pressure sensitive and capable of being progressively ruptured by the force of said anchor element, and (3) a small amount of a lubricant in such form and amount to allow said cement powder and said capsules to flow as free flowing solids; and

(b) introducing an anchor element into said grouting composition in said hole before any substantial hardening of said composition has occurred, whereby said grouting composition is forced into an annulus formed between said anchor element and the wall of said hole, said inorganic grouting composition reacts rapidly around said anchor element to form a hardened grout of sufficient strength to firmly anchor said support structure.

4,487,530
METHOD OF AND APPARATUS FOR SHORING A TRENCH

Anthony R. S. Morrice, 1 March Ave., Waterside, Knaresborough, N. Yorkshire, England

Filed Sep. 17, 1982, Ser. No. 419,388
Claims priority, application United Kingdom, Sep. 18, 1981, 8128245
Int. Cl.³ E02D *17/00*
U.S. Cl. 405—282 **10 Claims**

1. A method of shoring a trench comprising the steps of:

locating a trench shoring apparatus carrying a plurality of vertically movable sheet members and a pre-formed vertically movable waling frame on ground above a trench to be excavated,

moving said plurality of sheet members downwardly into the ground,

excavating between said sheet members,

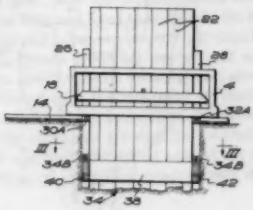
positioning between the inserted sheet members the movable waling frame so as to support said inserted sheet members,

one of moving the inserted sheet members further into the ground and excavating below the waling frame,

the other of moving the inserted sheet members further into the ground and excavating below the waling frame,

causing said downward movement of the sheet members by applying an upward pressure to said waling frame, said upward pressure being converted into a lateral pressure onto the trench sides, through the intermediary of the waling frame which is coupled to the apparatus, so as to increase the resistance to upward movement of the apparatus,

increasing the resistance to upward movement of the apparatus during the downward movement of the inserted sheet members by coupling one or more of the inserted sheet members to the apparatus,



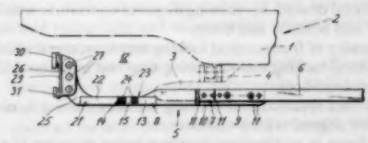
carrying out post-sheeting work in the excavated trench, and

causing upward movement of the sheet members by applying a downward pressure to said waling frame, said downward pressure being converted into a lateral pressure onto the trench sides through the intermediary of said waling frame which is coupled to the apparatus, so as to increase the resistance to downward movement of the apparatus.

4,487,531
TRAVELLING BRACKET

Ernst-Günter Nerlich, Essen; Hans-Ferdinand Bemmerl, Herne, and Peter Kröninger, Gelsenkirchen, all of Fed. Rep. of Germany, assignors to Bochumer Eisenhütte Heintzmann GmbH & Co. KG, Bochum, Fed. Rep. of Germany

Filed Oct. 8, 1982, Ser. No. 433,807
Claims priority, application Fed. Rep. of Germany, Dec. 18, 1981, 3150127
Int. Cl.³ E21D *23/00*
U.S. Cl. 405—291 **6 Claims**



1. A travelling bracket of a retracting and/or guiding device of mine support, particularly of a mine roof support, the travelling bracket comprising

a web flatly lying on a mine floor in a travelling path and having a mine face side; and

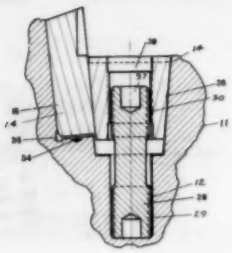
fixing elements provided at said mine face side of said web and arranged for releasably coupling with an abutment longitudinally displacing in a mine; and means for exchangeably but at the same time rigidly connecting said fixing elements to said web.

4,487,532

CONICAL WEDGE LOCK FOR CUTTER BLADE

Martin N. Hamilton, R.D. #4, Middle Rd., Meadville, Pa. 16335

Continuation-in-part of Ser. No. 414,965, Sep. 7, 1982,. This application Sep. 30, 1982, Ser. No. 431,031
The portion of the term of this patent subsequent to Sep. 18, 2001, has been disclaimed.
Int. Cl.³ B26D 1/00
U.S. Cl. 407—37 1 Claim



1. In combination, a cutter body, a blade, and a locking means for locking said blade in said body,

said cutter body being generally cylindrical in shape and having at least one axially extending helical slot therein,

said slot having a bottom and a back,

a plurality of elongated helical blade being made of relatively brittle material and having a top, bottom, back and front and being generally rectangular in cross section disposed in said slot,

said blades each having a front, a top, a bottom and a back each joining the other,

a cutting edge at the juncture of said top and front, comprising a plurality of longitudinally spaced notches formed in said cutting blade at said front and extending into said top and terminating in spaced relation to said back,

each of said notches comprising a part of an inside cylindrical wall with the cylinder having its central longitudinal axis spaced from said front of said insert, generally perpendicular to said top surface,

said notched cutting edge providing a plurality of adjacent intersectiong inside curved scallops, forming a continuous cutting edge at said top adapted to cut continuous, elongated, relatively narrow, generally wavy chips having a length about equal to the length of said blade,

said locking means comprising a plurality of axially spaced radially extending bores in said body adjacent said slots,

a plurality of frustoconical counter bores, one of said frustoconical counter bores being disposed concentric with each of said bores in said body,

a plurality of frustoconical locking members, one said frustoconical locking member being disposed in each said frustoconical bore,

each said frustoconical locking member having a central bore aligned with a said bore,

said bores in said locking members being threaded in a first hand thread and said bores in said body being threaded in a second hand thread,

a plurality of screws, each said screw having a first threaded end threadably engaging said bore in said locking member and a second end threadably engaging threads in a said bore in said body, whereby said screw may be rotated, drawing said frustoconical locking member into engagement with said front edge of said blade, clamping said blade in said slot,

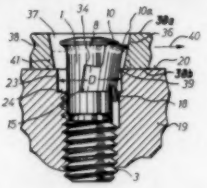
said groove in said cutter body having a longitudinally extending slot in the bottom thereof and a piano wire received in said slot whereby the blade is held in position.

4,487,533

MOUNT FOR MILLING TOOL BITS

Günter Wermeister, Ratingen, Fed. Rep. of Germany, assignor to Santrade Ltd., Lucerne, Switzerland

Filed Dec. 9, 1981, Ser. No. 329,063
Claims priority, application Fed. Rep. of Germany, Dec. 17, 1980, 3047459
Int. Cl.³ B23B 27/16
U.S. Cl. 407—105 10 Claims



1. In combination a bit holder, a tool bit, and a mounting means for securing said bit to said bit holder,

said bit holder comprising:

a mounting surface,

a hole extending into said mounting surface and defining a longitudinal axis, said hole including a shoulder spaced from said mounting surface and a threaded portion, and

limiting wall means extending transversely relative to said mounting surface,

said tool bit including:

an abutment surface engaging said mounting surface,

an outer surface disposed oppositely of said abutment surface, and

a through-bore extending through said bit from said outer surface to said abutment surface, said through-bore including a side wall having an inwardly extending portion which extends toward a longitudinal axis of said through-bore to define a through-bore cross-section which is smaller than a cross-section of said through-bore at said outer surface of said bit,

said mounting means comprising:

a screw defining a longitudinal axis and extending through said through-bore, said screw including a threaded end making threaded engagement with said threaded portion of said hole, and a wedge-like contact surface disposed at an end opposite said threaded end, and

a sleeve mounted on said screw so as to be inclinable relative thereto, said sleeve being split in a direction parallel to a longitudinal axis of said sleeve, said sleeve including first and second longitudinally spaced ends, said second end having first and second parts, an internal portion of said first end being wedgingly engaged by said contact surface and pushed thereby toward said hole to force said first part of said second end longitudinally against said shoulder and force said first end laterally outwardly, said second end including said second part which is spaced from said shoulder when said first part initially engages said shoulder to enable said sleeve to become inclined relative to said screw as said first end is forced laterally outwardly into engagement with said inwardly extending portion of said through-bore to transmit clamping forces thereagainst from said contact surface, said sleeve being inclined relative to said screw such that said longitudinal axis of said sleeve is non-parallel relative to said longitudinal axis of said screw to force said bit in a direction having a lateral component forcing said bit against said limiting wall means and a longitudinal component forcing said bit against said mounting surface,

the smallest cross-section of said through-bore being larger than the largest cross-section defined by said screw and sleeve when the longitudinal axes of said sleeve and screw are parallel, so that said bit is remov-

able from said mounting means with said screw threadedly secured in a loosened condition within said hole.

4,487,534

POLYGONAL CUTTING BIT

Norbert Reiter, Mettmann, Fed. Rep. of Germany, assignor to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany

Filed Sep. 30, 1982, Ser. No. 432,373

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1981, 3148535

Int. Cl.³ B26D *1/00*

U.S. Cl. 407—114 14 Claims

1. A cutting bit for cutting tools used for chip forming work, said bit comprising a polygonal cover face; cutting edges surrounding said cover face; and a plurality of chip forming elements arranged in rows, wherein each said row is spaced a distance from a respectively adjacent cutting edge, each said element has a base face which is joined to said cover face and a cross-section parallel to said base face which becomes smaller as the plane of the cross-section is moved away from said base face, and each said base face has three corners, one of said corners being oriented toward the internal region of said cover face while a line connecting the other two corners lies between the adjacent cutting edge and said one corner.

4,487,535

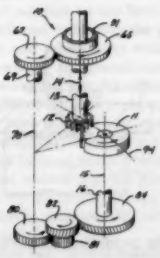
GEAR SHAPING MACHINE

Stuart J. Johnson, and George E. Fransson, both of Rockford, Ill., assignors to Barber-Colman Company, Rockford, Ill.

Filed Mar. 9, 1983, Ser. No. 473,724

Int. Cl.³ B23F *5/14*

U.S. Cl. 409—60 13 Claims



1. A machine having a shaping cutter for generating a plurality of spaced teeth around the periphery of a workpiece, said machine comprising rotatable cutter and work spindles respectively supporting said cutter and said workpiece for rotation about spaced parallel axes coinciding with the axes of said spindles, means for reciprocating said cutter spindle lengthwise to cause said cutter to move back and forth relative to said workpiece through an active cutting stroke and an inactive return stroke, and means for moving said cutter laterally toward and away from said workpiece in timed relation with the cutting and return strokes of the cutter so as to cause the cutter to engage the workpiece during said cutting stroke and to clear the workpiece during said return stroke, and drive means for rotating said spindles in timed relation with one another, said machine being characterized in that said drive means comprise first and second gears, one of said gears being coaxial with and fixed to said cutter spindle, the other of said gears being coaxial with and fixed to said work spindle, a shaft rotatable about an axis extending parallel to and spaced radially from the axes of said cutter and work spindles, a third gear coaxial with and fixed to said shaft and meshing with said first gear so as to rotate said first gear as an incident to rotation of said shaft, fourth gear means rotatably connecting said shaft with said second gear, said fourth gear means comprising a fourth gear coaxial with and fixed to said shaft, the axes of said spindles being disposed along a common arc struck from the axis of said shaft, means mounting one of said spindles for pivotal movement relative to the other spindle along said arc and about the axis of said shaft thereby to enable relative infeeding of the cutter and the workpiece, and means for moving said one spindle along said arc to effect said infeeding, the gear fixed to said one spindle orbiting around the axis of said shaft and remaining operably connected to said shaft during said infeeding.

4,487,536

DISTRIBUTING DEVICE OF THE PRESSURE EXERTED BY A MACHINE-TOOL CARRIAGE ON ITS SLIDES

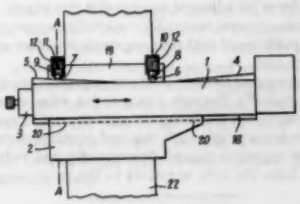
Guy Rouzaud, Chatenay, France, assignor to Centre D'Etudes Du Fraisage, Bagneux, France

Filed Jun. 28, 1982, Ser. No. 392,756

Claims priority, application France, Jul. 15, 1981, 81 13748

Int. Cl.³ B23B *47/26;* B23Q *23/00*

U.S. Cl. 409—239 6 Claims



1. A pressure distribution device for a machine tool of the type including a carriage having upper and lower sliding means disposed thereon for sliding horizontally on a support having at least a lower counter slide in slidable contact with said lower sliding means, the weight of said carriage bearing upon said lower slide and counter slide wherein said pressure distribution device comprises:

first and second longitudinal cams rigidly affixed to said carriage and spaced apart horizontally having a substantially horizontal surface therebetween, said cams having inclined surfaces intersecting said horizontal surface and extending upwardly therefrom; and

an upper counterslide disposed on said support comprising at each of its ends first and second vertically moveable roller means disposed opposite said first and second cams for respectively rolling on said first and second cams, spring means coupled to said rollers having a substantially vertical spring force for applying force to said rollers, said spring force increasing the downward force on said carriage being selected to supplement the weight of said carriage to provide a substantially uniform pressure distribution on said lower counter slide.

4,487,537

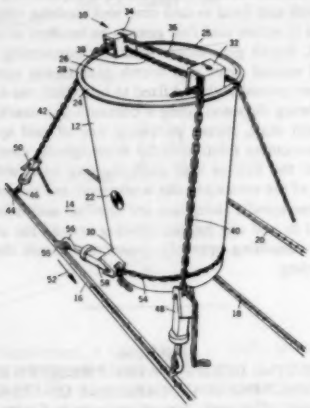
DRUM TIE-DOWN APPARATUS

Harvey E. Morse, Albuquerque, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 1, 1983, Ser. No. 462,817

Int. Cl.³ B60P 7/12

U.S. Cl. 410—47 10 Claims



1. A drum tie-down apparatus for securing drum-like containers in an upright position to a floor or platform of a transportation vehicle having spaced-apart cargo tie-down points, comprising:

first and second spaced apart hollow tube segments, whose longitudinal axes are horizontally oriented, engageable with a drum lid adjacent to opposite rim edges;

flexible strap segment means for connecting upper and lower central portions of said tube segments together across the drum lid; and

a pair of elongated flexible tie-down segments, each extending horizontally through a respective tube segment and having means for attaching the ends thereof to said spaced apart tie-down points such that end portions of the pair of tie-down segments extend downwardly and radially outwardly from the tube segments to the tie-down points.

4,487,538

BINDING MACHINES

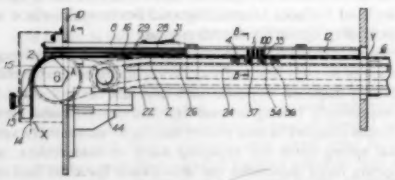
Leonard W. N. Jones, Camberley, and Ross Doughty, Weybridge, both of England, assignors to James Burn Bindings Limited, Surrey, England

Filed Mar. 4, 1982, Ser. No. 354,802

Claims priority, application United Kingdom, Apr. 14, 1981, 8111808

Int. Cl.³ B42C 1/12, 11/02

U.S. Cl. 412—39 9 Claims



1. A feed device for a wire binding element used in binding packets of perforated sheets together, said element being formed from a length of metal wire bent to form a series of curved hairpin-shaped prongs and having a longitudinal slot from one end thereof to the other, and said element being adapted to receive said sheets in impaled relation prior to closing said element into binding relation with said packet at a binding station, said feed device comprising

a toothed feed wheel and a toothed endless chain, said wheel and chain cooperating to feed said element to said binding station along a feed path between said wheel and said binding station,

an elongate guide located adjacent and parallel to that portion of said path between said wheel and said chain, said elongate guide being formed with opposite guide surfaces which converge toward one another, said elongate guide being oriented relative to said path so that said guide extends into said longitudinal slot of said element for guiding said element's prongs as said element moves between said wheel and said chain, and said convergent guide surfaces of said elongate guide being configured and sized to accommodate and to guide more than one size binding element,

a further guide substantially parallel to said path, and

spring means connected with said further guide, said spring means being adapted to urge said further guide toward said toothed chain for aid in interengagement of said element and said toothed chain.

4,487,539

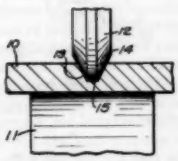
METHOD AND APPARATUS FOR THE SCORING AND PARTING OF CAN BODIES

Frederick G. Taylor, Camano Island, Wash., and Lawrence Casqueiro, Salem, Oreg., assignors to American Can Company, Greenwich, Conn.

Filed Jan. 24, 1983, Ser. No. 460,533

Int. Cl.³ B26D 3/00

U.S. Cl. 413—55 7 Claims



1. A method in the producing of metal cans including the steps of:

forming a score line on a sheet metal body plate;

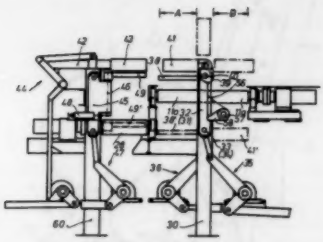
forming said sheet metal blank into a single can body of cylindrical tubular from with said score line being a circumferential score line on the can body;

conveying the single can body using a flexible conveyor belt on one side of the can body to an elongated parting rail having a parting edge positioned on the opposite side of the can body and rolling the can body along the parting edge while applying sufficient force, created by the belt acting against the can body, to separate it into two can bodies on the rail edge.

4,487,540
STACKING MACHINE FOR ROLLED BAR SHAPES

Otto K. Buchheit, Ingbert, Fed. Rep. of Germany, assignor to Mannesmann Aktiengesellschaft, Duesseldorf, Fed. Rep. of Germany

Filed Oct. 12, 1982, Ser. No. 433,465
Claims priority, application Fed. Rep. of Germany, Oct. 20, 1981, 3141476
Int. Cl.³ B65G 57/18
U.S. Cl. 414—30 2 Claims



1. A stacking machine for the interlocking method of stacking rolled bar shapes on a stacking roller table on which a completed stack is discharged toward the next area, utilizing rotatable magnetic turnover arms for inversion of a partial group of n−1 bars onto a non-inverted partial group of n bars, characterized by

(a) a feed roller table (11a), the width of which is larger than that of the two partial groups of 2n−1 bars,

(b) a wedge-shaped separating gib (29) extending over the length of the feed roller table portion ahead of the stacking machine (27), for separation of a group of 2n−1 bars into two partial groups of bars (50, 51), continued down to the end of the feed roller table by two separating walls (29a) spaced in parallel relationship,

(c) vertical guides (30) disposed between the separating walls (29a) over the length of the feed roller table, to guide up and down movement of two groups of push rods (31, 32) in which either said push rods may operate in said groups or said groups may operate commonly,

(d) swivel shafts (37, 40) supported on the upper ends of the push rods of each group, with swivel drives for rotatable braking skids (38, 41) connected to the swivel shafts for elevation of the partial groups of bars from the roller table in the horizontal position of the braking skids which extend in groups left and right over the partial widths of the feed roller table and which may rotate into the vertical position subsequent to an upward stroke, in which they may move downward in simultaneous alignment with the vertical guides (30) of the push rods, to a point from which they may rotate back into the horizontal working position without intersecting the roller table level,

(e) the design of the braking skids which, in their horizontal working positions, extend over the partial width (B) of the feed roller table for the partial groups (51) of n−1 bars, to function as turnover magnets (41) which may be rotated selectively through 90° or 180°,

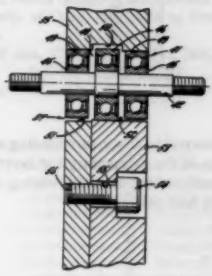
(f) horizontal guides (42) approximately on level with the turnover magnet braking skids (41) in their uppermost horizontal swivel positions, provided to guide back and forth movement of receiving magnets (43) which move double layers of bars (52) suspended therefrom from their position on the roller table partial width (A) for partial groups (50) of n bars to a position over the stacking roller table (28) located beside the feed roller table,

(g) vertical guides (60) disposed externally beside the stacking roller table for up and down movement of push rods (45) which support vertical swivel shafts (46) and swivel drives (48), the swivel shafts being connected to stacking table arms (49) which may move back and forth horizontally to receive double layers of bars (52) and which may swivel back into their receiving positions above the stack of bars exiting on the stacking roller table and below the level of the horizontally supported receiving magnets (43) without intersecting the stack.

4,487,541
MACHINE FOR HANDLING PARTS

Paul H. Dixon, Belvidere, Ill., assignor to Dixon Automatic Tool, Inc., Rockford, Ill.

Filed Sep. 28, 1981, Ser. No. 305,912
Int. Cl.³ B65H 5/00
U.S. Cl. 414—225 6 Claims



1. A parts handling machine comprising a support, a carriage movable back and forth on said support and having means operable to pick up a part at a loading station and to release the part at a delivery station spaced from said loading station, said support having a cam track with opposing walls defining the path of movement of said carriage, a rod on said carriage, first and second coaxial rollers rotatably mounted on said rod and located within said track, said first and second rollers engaging one wall of said track and being free of engagement with the other wall of said track, a third roller rotatably mounted on said rod between said first and second rollers and located within said track, and said third roller engaging said other wall of said track and being free of engagement with said one wall of said track whereby said rollers prevent radial play of said rod between the walls of said track and whereby each roller rides along only a single wall of said track as said carriage moves back and forth.

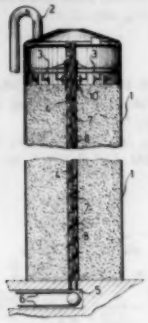
4,487,542
GASTIGHT HIGH-RISE SILOS

Hermann Johanning, and Heinz G. Aulbert, both of Melle, Fed. Rep. of Germany, assignors to Engelbrecht & Lemmerbrock GmbH & Co., Melle, Fed. Rep. of Germany

Filed Sep. 1, 1982, Ser. No. 413,690
Claims priority, application Fed. Rep. of Germany, Sep. 8, 1981, 3135439
Int. Cl.³ B65G 67/06
U.S. Cl. 414—292 12 Claims

1. In a gastight high-rise silo of the kind provided with a respirator bag, for reception of bulk goods which are not spontaneously flowable, and which are conveyed inwards from the outside to a central vertical gravity shaft from the top layer of the material and in radial direction by at least one feed element comprising clearing elements, said feed element distributing the material whilst the silo is being filled, the invention which consists in that said silo has combined with it a rigid, stationary, tubular gravity shaft, means for closing the bottom of said shaft, said shaft terminating above the maximum level of the material within said silo and is provided with perforations distributed along its height and circumference, of which at least one said perforation is situated at each vertical position of the momentary level of the surface of the material

dropping by being cleared, and wherein said feed element includes clearing elements and is reversible in its direction of rotation and liftable during the loading of said silo, and is



connected to a removable cover surrounding said shaft, which cover, in the areas of the momentary top layer of the material, prevents a penetration of the material running into said silo into said shaft through said perforations.

4,487,543

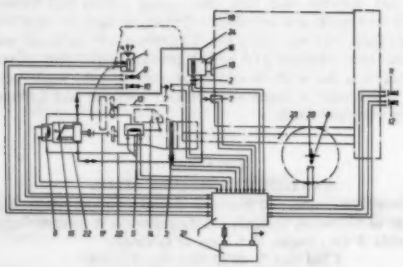
GARBAGE TRUCK WITH REVOLVING RECEPTACLE

Martin Nitz, Wesel, Fed. Rep. of Germany, assignor to Gabler GmbH & Co. KG, Wesel, Fed. Rep. of Germany

Filed Apr. 29, 1982, Ser. No. 372,961

Int. Cl.³ B65F *3/22*

U.S. Cl. 414—468 **3 Claims**



1. A diesel engine garbage truck having a revolving receptacle with a hydrostatic drive,

said hydrostatic drive having an adjusting pump driven by a diesel engine,

an electro-hydraulic linear servo drive coupled to said diesel engine for controlling said diesel engine,

an electro-hydraulic servo controller coupled to said adjusting pump,

a control circuit coupled to said servo drive and said servo controller,

a closed hydraulic circuit coupling said adjusting pump to said hydrostatic drive for said receptacle,

and transmitter means coupled between said hydrostatic drive and said diesel engine for providing said control circuit with revolution rates of said drive and said diesel engine for controlling the operation of said garbage truck.

4,487,544

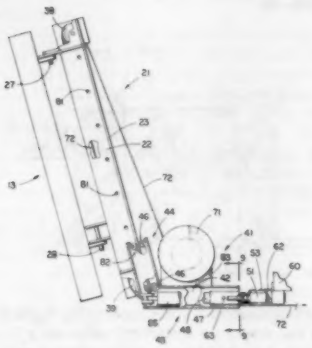
TOWING VEHICLE

John S. Hubbard, R.R. 1, Box 36, Parker City, Ind. 47368

Filed Sep. 13, 1982, Ser. No. 417,185

Int. Cl.³ B60P *3/12*

U.S. Cl. 414—563 **5 Claims**



1. A vehicle for acquiring and towing a load comprising a base and a suppport means extending upwardly from the base, an elongated vertically inclined member pivotally mounted on said support means and carrying idler sheaves thereon adjacent its upper and lower ends, carrier means supported by and movable along the length of said inclined member, the mounting of said inclined member providing for pivotal movement thereof about an axis parallel to the inclined member's longitudinal axis, said carrier means including a saddle being adapted to engage and support the leading portion of said load, a winch mounted on said carrier means and having a cable passing through said idler sheaves, said cable having one end being adapted for attachment to the trailing portion of the load so that reeling in said cable by the winch elevates said carrier means on said inclined member and raises the leading portion of the load, and power means carried by said support means and acting on said inclined member to pivot it about said axis parallel to its longitudinal axis to facilitate the acquisition of loads laterally displaced from the towing vehicle, said cable and winch being located on said inclined member to pivot with said idler sheaves as a unit whenever said power means pivots said inclined member.

5. A towing vehicle comprising:

a base;

a vertically inclined member pivotally mounted on said base;

carrier means slidably mounted to said inclined member and movable vertically therealong, said carrier means being pivotable with said inclined member about a first axis parallel to said inclined member, said carrier means having a towed vehicle engaging portion pivotable about a second vertical axis;

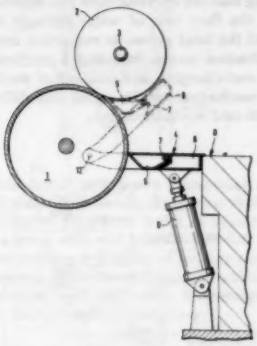
winch means mounted on said carrier means and having a cable extending therefrom upwardly along said member and then downwardly therebeneath being attachable to the rear portion of a towed vehicle having a front portion supported by said engaging portion of said carrier means, said winch means operable to hold said cable while said carrier means moves along said member transferring load from said front portion to said towing vehicle, said winch means and said cable pivotable about said first axis as a unit with said carrier means and said inclined member.

4,487,545

METHOD AND APPARATUS FOR LOWERING WEB ROLLS IN WINDING MACHINES

Herbert Schönmeier, Düsseldorf, Fed. Rep. of Germany, assignor to Jagenberg AG, Düsseldorf, Fed. Rep. of Germany

Filed Mar. 15, 1982, Ser. No. 358,483
Claims priority, application Fed. Rep. of Germany, Apr. 30, 1981, 3117093
Int. Cl.³ B65G 65/00
U.S. Cl. 414—684 6 Claims



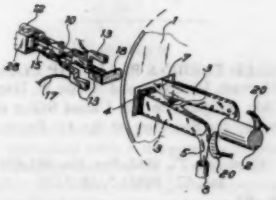
1. A method for lowering a roll wound with a web on a winding machine wherein the roll is supported on the upper portion of the circumference of a support roll with the axes of the roll and support roll lying in different parallel vertical planes, the roll being formed by winding the web onto a core tube carrying end insets, the method comprising lifting the web roll from below so as to relieve the weight of the wound web roll from the end insets, withdrawing the end insets from the core tube, and then lowering the web roll to a removal level while out of contact with the support roll.

4,487,546

DEVICE FOR TRANSFERRING TUBULAR FABRICS FROM SUPPORT HANGERS TO A RIGID BODY AND INVERTING THE FABRIC

Giuseppe Cassinelli, Varese, Italy, assignor to Savio & C. S.p.A., Milan, Italy

Filed Jul. 14, 1982, Ser. No. 398,443
Claims priority, application Italy, Aug. 5, 1981, 23382 A/81
Int. Cl.³ A41B 11/00
U.S. Cl. 414—751 3 Claims



1. A device for shifting tubular fabric carried by support hangers and transfering the same by inversion thereof on a rigid body, the device comprising:

a longitudinally movable slide mounted on fixed guides for generating movement toward and away from said support hangers and toward and away from said rigid body;

a plurality of jaw members including at least four elements hinged on said slide;

means interconnecting said elements for generating rotation of said elements between a position at which such elements are proximate one another and a position at which said elements are spread apart, each of said elements having a stem mounted thereon; and

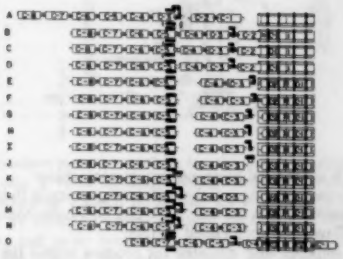
control means for moving said slide in a forward or reverse direction between the position at which said elements are remote from said support hangers and said rigid body and a position at which said elements act upon an edge of an opening formed in said tubular fabric and for moving said elements.

4,487,547

METHOD FOR RANDOM CAR TRAIN POSITIONING

James E. Cornish, North Olmsted, and Edward T. Manning, Jr., Bay Village, both of Ohio, assignors to Dravo Corporation, Pittsburgh, Pa.

Filed Jun. 17, 1982, Ser. No. 389,249
Int. Cl.³ B65G 67/50
U.S. Cl. 414—786 4 Claims



1. A method for positioning railroad cars to be dumped in a rotary car dumper by the use of a car positioning device having an arm thereon with forward and aft couplers, where the railroad cars each have a lead coupler and a trailing coupler thereon which may be coupled to said forward and aft couplers, wherein there is a space provided between restraining means for the railroad cars and the rotary dumper, comprising:

(a) positioning a first railroad car in the space between the restraining means and the dumper;

(b) coupling the aft coupler of the car positioner with the lead coupler of a second railroad car restrained by the restraining means;

(c) releasing the restraining means and moving the car positioner towards the car dumper pulling the second railroad car therewith;

(d) coupling the forward coupler of the car positioner with the trailing coupler of the first railroad car and moving the first railroad car towards the dumper;

(e) engaging the restraining means to restrain a third railroad car;

(f) uncoupling the trailing coupler of the second railroad car from the third railroad car;

(g) moving the positioner further towards the dumper and positioning the first car in the dumper solely by use of the car positioner;

(h) uncoupling the forward coupler of the car positioner from the trailing coupler of the first railroad car;

(i) moving the car positioner and second railroad car to a position spaced from the car dumper and the restraining means;

(j) uncoupling the aft coupler of the car positioner from the leading coupler of the second railroad car;

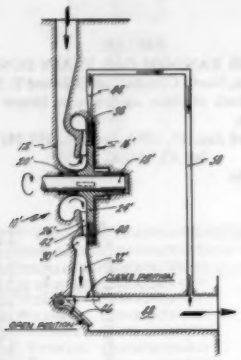
(k) returning the car positioner to a position between the third railroad car and the second railroad car; and

(l) repeating the steps of b-k.

4,487,548
CENTRIFUGAL MAIN FUEL PUMP HAVING STARTING ELEMENT

Frank A. Leachman, Jr., Bristol, and Godwin L. Noell, Winsted, both of Conn., assignors to Chandler Evans Inc., West Hartford, Conn.

Filed May 19, 1983, Ser. No. 495,987
Int. Cl.³ F01D *19/00*
U.S. Cl. 415—28 3 Claims



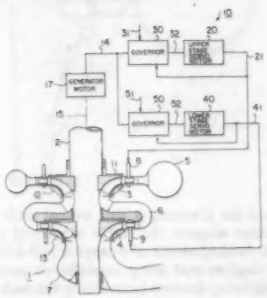
1. A centrifugal pumping system comprising:
a housing having an inlet, a pumping cavity in fluid communication with the inlet, a starting flow collector and a main flow collector defined therein;
an impeller disc mounted for rotation within the pumping cavity;
a plurality of starting flow impeller elements on the disc adapted to discharge flow to the starting flow collector at a radially outer location;
a plurality of main flow impeller elements on the disc adapted to discharge flow to the main flow collector at a radially inner location;
a discharge conduit;
conduit means to direct flow from the starting flow collector and the main flow collector to the discharge conduit; and
check valve means to prevent flow from the starting flow collector from entering the main flow collector until the pressure generated by the main flow impeller elements exceeds the pressure in the discharge conduit.

4,487,549
APPARATUS FOR CONTROLLING OPERATION OF HYDRAULIC MACHINE

Tsunehiko Takakusagi, and Keizo Kikuchi, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 15, 1982, Ser. No. 388,710
Claims priority, application Japan, Jun. 17, 1981, 56-92253
Int. Cl.³ F01D *17/06*
U.S. Cl. 415—30 27 Claims

1. A hydraulic machine, comprising:
a shaft;
a plurality of annular runners coaxially mounted in axially spaced apart relationship on said shaft;
means supplying water, guiding the water between the runners, and discharging the water to connect said runners hydraulically in series;
first movable flow rate adjusting vanes mounted immediately adjacent one of said runners and hydraulically in series between said one runner and another runner;
second movable flow rate adjusting vanes mounted immediately adjacent said another runner and serially on the side of said another runner opposite from said one runner;
means for detecting the rotational speed of the hydraulic machine and providing a detected speed signal;
means for providing a command speed signal;
means for comparing said detected speed signal with said command speed signal and providing a mechanical stroke signal in accordance with the deviation obtained from the comparison;
mechanical means drivingly connected to one of said first and second movable flow rate adjusting vanes and directly receiving said mechanical stroke signal for opening and closing said one movable flow rate adjusting vanes for adjusting the flow rate of water through its respective runner and the head across its respective runner;
second mechanical means, including a mechanical link, for receiving and changing said mechanical stroke signal to a different mechanical stroke signal that differs in accordance with said mechanical link;



third mechanical means drivingly connected to the other of said movable flow rate adjusting vanes and directly receiving said different mechanical stroke signal for opening and closing said other movable flow rate adjusting vanes for adjusting the flow rate of water through its respective runner and the head across its respective runner, so that said means for providing a command signal and said means for comparing produces only a single mechanical stroke signal that directly controls the adjustment of the vanes for only one runner and the head across the runner while said second and third mechanical means subordinately adjusts the vanes for the other runner and thereby the head across the other runner mechanically in accordance with the mechanical stroke signal for the one runner and in a relationship as determined by said mechanical link.

4,487,550
COOLED TURBINE BLADE TIP CLOSURE

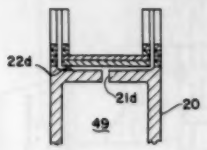
Richard L. Horvath, Hamilton, and Robert W. Harris, Fairfield, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 27, 1983, Ser. No. 461,424
Int. Cl.³ F01D *5/18, 5/20*
U.S. Cl. 416—92 8 Claims

1. An improved rotor blade for a turbine engine which comprises:
a. a hollow casting including a dovetail at the radially inward end thereof providing means for mounting said blade to the rotor of said turbine, and a cast end wall at the radially outward end thereof, said casting having cambered side walls defining an interior chamber having an inlet near side dovetail and an outlet through said end wall for passage of coolant fluid through said blade;
b. a tip end closure for said blade bonded to said end wall of said casting, said tip end closure comprising a plurality of

metallic layers, each layer having a peripheral shape conforming to the camber of said side walls;

c. the first said layer adjacent said end wall comprising a metallic plate defining a plurality of holes around its periphery, and means defining a plurality of channels on the surface thereof confronting said end wall and communicating with said peripheral holes and said outlet, for conducting said coolant from said outlet toward said side walls;



d. the remainder of said layers comprising a plurality of marginal plates each having peripheral blades registering with respective peripheral holes in adjacent plates and communicating with said holes in said first plate; and

e. said layers defining a plurality of radially outwardly opening passageways near the periphery of said tip end closure, communicating with said outlet, for passage of said coolant fluid through said tip end closure.

4,487,551

FAN ASSEMBLY FOR VEHICLES

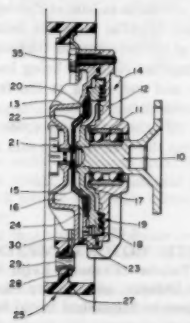
Ken-Ichiro Mizutani; Hiroto Masai, and Nobuyoshi Kozawa, all of Aichi, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Continuation of Ser. No. 180,995, Aug. 25, 1980, abandoned. This application Feb. 14, 1984, Ser. No. 578,617

Claims priority, application Japan, Sep. 28, 1979, 54-125593

Int. Cl.³ B64C *11/12, 27/72*

U.S. Cl. 416—135 **1 Claim**



1. In a cooling fan assembly, including fan blades and an annular boss, associated with a temperature-responsive rotational means rotatably mounted on a driving shaft through a bearing assembly in a fixed housing, the improvement comprises axially resilient means for compensating for possible misalignment of said fan assembly caused by misalignment of said rotational means relative to said driving shaft upon rotation of said fan assembly due to the inertial moment thereof, said axially resilient means including: a flat, resilient, unitary, generally circular-shaped, plate spring, one face of said plate spring abutting a face of said housing, the opposite face of said plate spring abutting said boss of said fan assembly, said plate spring having an annular stem, a plurality of tongues extending radially outward from said stem, said tongues being equally spaced from each other around said stem, and an extension extending circumferentially from each tongue; means for securing each tongue to said housing; and means for securing each extension to said boss of said fan assembly.

4,487,552

DYNAMIC-PRESSURE MACHINE FOR CHARGING INTERNAL-COMBUSTION ENGINES

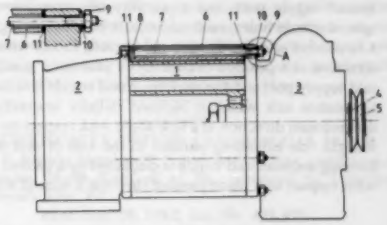
Werner Haase, Waldshut, Fed. Rep. of Germany, and Andreas Mayer, Niederrohrdorf, Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Nov. 4, 1981, Ser. No. 318,126

Claims priority, application Switzerland, Nov. 4, 1980, 8188/80

Int. Cl.³ F04F *11/00*

U.S. Cl. 417—64 **9 Claims**



1. In a dynamic pressure machine for charging a combustion engine having a rotor housing, a rotor located within the housing carried by a metal rotor shaft for compressing combustion air by means of enging exhaust gases, and an exhaust gas housing and an air housing each of which close a corresponding end face of the rotor housing, the improvement comprising:

the rotor and the surrounding rotor housing being fabricated of ceramic material;

first connecting means for connecting the rotor to the metal rotor shaft and second connecting means for connecting the rotor housing to the gas housing and air housing, at least the second connecting means including resilient elements which exert a prestressing force on the connected parts, the force acting parallel to the axis of the rotor shaft and being operable over the entire operating temperature range of the machine;

the ceramic rotor housing is a circularly cylindrical shell with bores parallel to its axis; and

the second connecting means for connecting the rotor housing to the gas housing and air housing includes bolts which are received in corresponding bores of the rotor housing, the resilient elements comprising a cup spring retained by a nut secured to a respective bolt; and the first connecting means between the rotor and the rotor shaft includes an elastic bolt provided on an end face of the rotor shaft, the bolt having a centering pin received by a hub bore of the rotor, at least one washer and a nut for retaining the assembly.

4,487,553

JET PUMP

Fumio Nagata, 8-14, Mikuni 1-chome, Toyonaka-shi, Osaka 561, Japan

Filed Jan. 3, 1983, Ser. No. 455,521

Int. Cl.³ F04F *5/42, 5/46*

U.S. Cl. 417—171 **3 Claims**

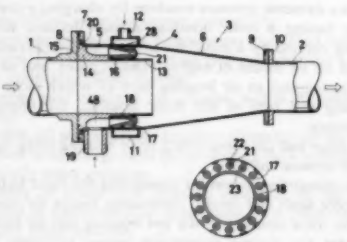
1. A jet pump for transporting a fluid in a linear direction, said jet pump comprising:

an outer pipe including an upstream cylindrical portion, adapted to be connected to a first transport pipe from which a fluid is to be pumped, and a downstream conical

portion, adapted to be connected to a second transport pipe to which fluid is to be pumped;

an inner pipe coaxially positioned within said outer pipe, said inner pipe having therethrough a cylindrical passage having an inlet end adapted to receive the fluid from the first transport pipe and an outlet end adapted to discharge the fluid into the interior of said conical portion, said inner pipe having adjacent said inlet end an outwardly extending flange sealed to said cylindrical portion, and said inner pipe having external threads;

means for drawing fluid through said passage in said inner pipe, said drawing means comprising an annular nozzle forming member threaded onto said external threads and positioned coaxially between said cylindrical portion of said outer pipe and said inner pipe, said nozzle forming member having therein a plurality of circumferentially spaced supply ports and a plurality of circumferentially spaced nozzle holes, each said nozzle hole extending from a respective said supply port and opening in a downstream direction at a position outwardly of said inner pipe, each said supply port and the respective said nozzle hole having a common axis which is inclined radially inwardly in a downstream direction at a first angle with respect to a first straight line extending parallel to the axis of said nozzle forming member and which is displaced by a second angle with respect to a plane passing through a second straight line extending parallel to said axis of said nozzle forming member and through said axis, said first angles of all of said common axes being equal, and said second angles of all of said common axes being equal, and means for supplying a high pressure fluid to said plurality of supply ports, such that said high pressure fluid is discharged from said plurality of nozzle holes as a plurality of spirally swirling jets, thereby drawing the fluid through said cylindrical passage in said inner pipe; and



means for forming a fluid layer around said jets and the fluid and thereby for preventing cavitation by said jets, said cavitation preventing means comprising an annular header positioned about said cylindrical portion of said outer pipe and connected to a source of layer-forming fluid, an annular groove formed in the outer periphery of said nozzle forming member and connected to said header, and a plurality of circumferentially spaced notches formed in the outer periphery of said nozzle forming member, each said notch being positioned radially outwardly of a respective said nozzle hole, and each said notch extending from said annular groove in a direction parallel to said axis of said nozzle forming member and opening into the interior of said conical portion, whereby said jets discharged from said nozzle holes draw in said layer-forming fluid through said notches, thus forming a layer between the interior of said conical portion and said jets and the fluid being transported.

4,487,554

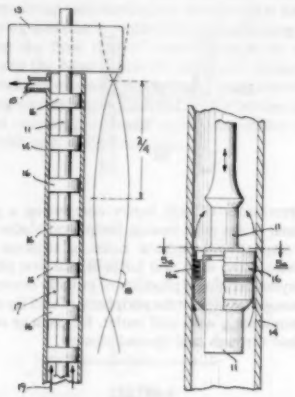
SONIC PUMP FOR PUMPING WELLS AND THE LIKE EMPLOYING A ROD VIBRATION SYSTEM

Albert G. Bodine, 7877 Woodley Ave., Van Nuys, Calif. 91406

Continuation of Ser. No. 356,184, Mar. 8, 1982, abandoned. This application Feb. 27, 1984, Ser. No. 582,158

Int. Cl.³ F04F *7/00*; **B01F** *11/00*

U.S. Cl. 417—241 **9 Claims**



1. A pumping system for pumping fluid out of a well comprising

a tubing string conducting said fluid installed in said well and running down said well,

a rod string fabricated of elastic material contained within said tubing string and running therealong, said rod string being spaced from the tubing string,

vibration generator means for providing vibrational energy to said rod string at a frequency such as to effect resonant standing wave vibration of said rod string, and

a plurality of sonic impeller elements fixedly mounted on said rod string at spaced intervals therealong, the spacing between said impeller elements being less than a quarter wavelength in said rod string at the frequency of said standing wave vibration,

the sonic energy effecting pumping action of the impeller elements to pump the well fluid up said tubing string.

4,487,555

HERMETIC MOTOR COMPRESSOR

Okinobu Ohinata; Takuho Hirahara; Keiju Sakaino; Yawara Uzawa; Nobuhiro Shimizu, and Shigeru Shida, all of Shizuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 14, 1981, Ser. No. 330,466

Claims priority, application Japan, Feb. 13, 1981, 56-19699; Jun. 26, 1981, 56-99328; Jul. 7, 1981, 56-105910

Int. Cl.³ F04B *21/00, 39/00, 39/06*

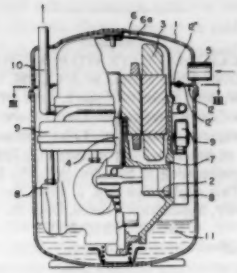
U.S. Cl. 417—312 **18 Claims**

1. A hermetic motor compressor which comprises:

(a) a closed housing which covers a motor and a compressor means, said closed housing having an inlet port formed therein for a recycling coolant;

(b) a partition wall which separates a lower temperature compartment into which said inlet port opens and a higher temperature compartment within said closed housing, said lower temperature compartment containing at least a part of said motor, said higher temperature compartment containing said compressor means, a coolant muffler, and a

loop part of an outlet pipe, and said partition wall being made of an elastic material; and



(c) a fitting for supporting said partition wall, said fitting being mounted on said closed housing and being made of a rigid material.

4,487,556

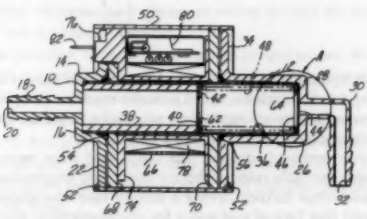
LOW COST ELECTROMAGNETIC FLUID PUMP

Michael V. Wiernicki, Trumansburg, N.Y., assignor to Facet Enterprises, Incorporated, Tulsa, Okla.

Filed Aug. 2, 1982, Ser. No. 404,159

Int. Cl.³ F04B *17/04*

U.S. Cl. 417—417 **9 Claims**



1. An electromagnetic fluid pump comprising:

a molded plastic inlet cap having an axial inlet port provided therein;

a molded plastic outlet cap spaced apart from said inlet cap and having an outlet port therein, said inlet cap and said outlet cap each having a radially extending flange of the same diameter;

a cylindrical non-magnetic piston guide member having one end disposed in said inlet cap and the other end disposed in said outlet cap;

a magnetic permeable cylindrical piston disposed in said piston guide member and slidable therein;

a first washer disposed adjacent to said piston and slidable therewith, said first washer having an internal diameter smaller than the internal diameter of said piston;

a first thin plastic disk disposed between said first washer, said first thin plastic disk having a diameter approximately equal to the outside diameter of said piston and a concentric circular slot partially circumscribing a central flapper member, said central flapper member having a diameter intermediate the internal diameter of said piston and said first washer;

a second washer disposed in said piston guide member adjacent to said inlet cap having an internal diameter larger than said inlet port and concentric therewith;

a second thin plastic disk disposed in said piston guide member between said second washer and said inlet cap, said second thin plastic disk having a diameter approximately equal to the diameter of said second washer and a concentric circular slot partially circumscribing a central flapper member, said central flapper member having a diameter intermediate the internal diameter of said second washer and the diameter of said inlet port;

resilient means disposed between said first and second washers for producing a force biasing said first washer, said first thin plastic disk and said piston towards said outlet port;

solenoid coil means circumscribing said piston guide member intermediate said radially extending flanges of said inlet and outlet caps;

oscillator means for periodically energizing said solenoid coil means to generate a magnetic field urging said piston towards said inlet port against said biasing force of said resilient means; and

a metal sleeve disposed over said radially extending flanges of said inlet and outlet caps and enclosing the volume therebetween; said metal sleeve including means on the opposite ends thereof for engaging the periphery of said radially extending flanges and locking said piston guide member between said inlet and outlet caps.

4,487,557

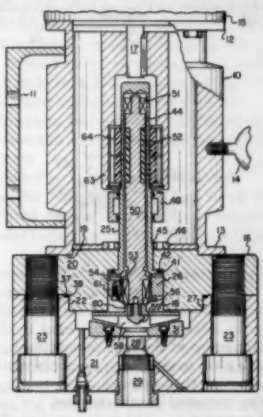
MAGNETICALLY DRIVEN CENTRIFUGAL PUMP

Robert F. Ruyak; Theodore R. Silver, both of Erie, and Rocco J. Tomasino, North East, all of Pa., assignors to Autoclave Engineers, Erie, Pa.

Filed Sep. 28, 1982, Ser. No. 425,870

Int. Cl.³ F04B *35/04;* F03B *11/06;* H02K *5/10*

U.S. Cl. 417—420 **7 Claims**



1. A high pressure centrifugal pump comprising:

an impeller having an axis of rotation;

a metal casing defining a pumping chamber, said pumping chamber sized and configured to receive said impeller, the casing defining an intake passage along an extension of the axis of rotation, and an outlet passage extending from the periphery of the impeller, said casing comprising a mounting plate having a countersunk bore therein along the impeller axis extending away from the impeller and a front plate defining the circumferential periphery of the pumping chamber and the inlet passage, said mounting plate and front plate have a rabbeted joint and together define an annular space for receiving a seal and means for securing the mounting plate and front plate together;

a nonmagnetic metal canister comprising an elongate barrel sealed at one end and extending away from the pumping chamber and in communication therewith, said canister surrounding the extension of the impeller axis in a direction away from the intake passage;

a metal impeller shaft fixed at one end to the impeller, said shaft being journaled in the nonmagnetic canister, said shaft having mounted thereto circumferentially magnetized rare earth cobalt magnets;

a first self-lubricating bushing positioned in the nonmagnetic canister for rotatably holding the impeller shaft;

a second self-lubricating bushing positioned at least partially in the nonmagnetic canister for rotatably holding the impeller shaft and restraining its axial movement;

means adjacent the impeller for precision adjusting of the second bushing along the impeller axis; and

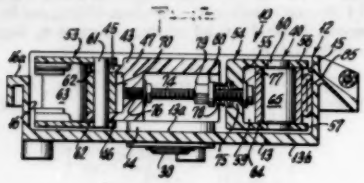
a drive magnet assembly comprising a sleeve journaled about the nonmagnetic canister with circumferentially magnetized rare earth cobalt magnets mounted therein, whereby rotation of the sleeve results in synchronous rotation of the impeller and impeller shaft.

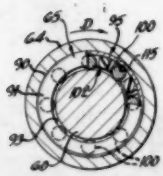
4,487,558

PERISTALTIC PUMP

Vernon H. Troutner, St. Petersburg, Fla., assignor to Extracorporeal Medical Specialties, Inc., King of Prussia, Pa.

Filed Aug. 23, 1982, Ser. No. 410,736
Int. Cl.³ F04B 43/12, 45/08
U.S. Cl. 417—477 **1 Claim**





1. In a roller pump of the type comprising:

(a) a backing plate having an upper surface, a lower surface, and an opening therethrough,

(b) a bearing mounted in said opening,

(c) a shaft mounted in said bearing, said shaft having a first end portion and a second end portion, the first end portion of the shaft extending upwardly from the upper surface of the backing plate and having an opening inwardly from the upper end of the shaft, the second end portion of the shaft extending downwardly from the lower surface of the backing plate and being adapted for coupling to a drive means,

(d) an upstanding arcuate backing wall on the upper surface of the backing plate,

(e) a pump head removably mounted for rotation in a first circumferential direction on the upper portion of the shaft, said pump head comprising a hub portion and at least one roller means mounted for rotation about an axis which is parallel to the axis of said shaft,

(f) a handle means comprising an arm being pivotally mounted on said pump head and adapted to be engaged with said opening in said shaft to mechanically couple said pump head to said shaft,

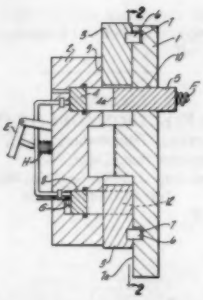
the improvement wherein said roller means is mounted for rotation in a combination bearing and overriding clutch assembly which allows rotation of the roller means in the direction which is opposite to said first circumferential direction and prevents rotation of the roller means in said first circumferential direction.

4,487,559

HYDRAULIC MACHINE WITH RETRACTABLE PARTITIONS AND VARIABLE CUBIC CAPACITY

Antoine Berger, and Francois Gibert, both of Loire, France, assignors to Centre Stephanois De Recherches Mecaniques Hydromecanique et Frottement, Loire, France

Continuation of Ser. No. 293,558, Aug. 17, 1981, abandoned, which is a continuation of Ser. No. 969,229, Dec. 13, 1978, abandoned. This application Sep. 2, 1983, Ser. No. 528,994
Claims priority, application France, Dec. 13, 1977, 77 38914
Int. Cl.³ F03C 2/00
U.S. Cl. 418—25 **5 Claims**



1. A hydraulic machine having a source of fluid for driving said hydraulic machine, said hydraulic machine comprising:

a stator having a longitudinal axis and a first face disposed transversely across said longitudinal axis;

a rotor mounted adjacent said stator, said rotor being rotatably movable relative thereto about said longitudinal axis, said rotor further having a second face contiguous with said first face of said stator for communication therewith;

a circumferentially sealed circular groove formed in said second face of said rotor, said circumferentially sealed circular groove having an annular base disposed a first predetermined depth into said rotor from said first face of said stator;

inlet fluid aperture means formed in said first face of said stator and opening into a first portion of said circumferentially sealed circular groove, said inlet fluid aperture means being interconnected with said source of fluid such as to supply said first portion of said circumferentially sealed circular groove with fluid;

outlet fluid aperture means formed in said first face of said stator and opening into a second portion of said circumferentially sealed circular groove, said outlet fluid aperture means being interconnected with said source of fluid such as to permit discharge of fluid from said second portion of said circumferentially sealed circular groove;

an axially movable sleeve member slidably and sealingly mounted in said circumferentially sealed circular groove such as to be selectively movable towards and away from said first face of said stator, said axially movable sleeve member having a first annular face disposed adjacent said annular base of said circumferentially sealed groove and a second annular face disposed adjacent said first face of said stator, said first annular face being spaced a second predetermined distance from said second annular face, said second predetermined distance being less than said first predetermined distance, said axially movable sleeve

member defining a first predetermined volume of fluid between said first face of said stator and said second annular face of said axially movable sleeve member, said first predetermined volume varying with the axial position of said axially movable sleeve member in said circumferentially sealed circular groove relative to said annular base;

an aperture through said first face of said stator at a location between said inlet fluid aperture means and said outlet fluid aperture means, said aperture being aligned with a portion of said circumferentially sealed circular groove;

a slidably movable reaction member slidably and sealingly mounted in said aperture through said first face of said stator and extending therefrom into said circumferentially sealed circular groove, said slidably movable rection member sealingly engaging an intermediate portion of said circumferentially sealed circular groove between said first and second portions thereof and being selectively sealingly engageable with a portion of said axially movable sleeve member, said slidably movable reaction member further being axially movable within said aperture towards and away from said annular base of said circumferentially sealed circular groove;

biasing means, biasing said axially movable sleeve member against said slidably movable reaction member such that said slidably movable reaction member sealingly engages said axially movable sleeve member, said slidably movable reaction member thereby being selectively movable to vary said first predetermined volume between predetermined minimum and maximum values to vary the power of said hydraulic machine;

a first plurality of radial slots formed in said second face of said rotor and extending across said circumferentially sealed circular groove a third predetermined depth into said second face of said rotor, said third predetermined depth being less than said first predetermined depth;

a second plurality of radial slots formed in said axially movable sleeve member and aligned with said first plurality of radial slots;

a plurality of radially movable partition members each reciprocably disposed in one of said first plurality of radial slots, each of said plurality of radially movable partition members being selectively movable radially inwardly into one of said second plurality of radial slots such as to extend across said circumferentially sealed circular groove and further such as to cooperate with said slidably movable reaction member to sealingly divide said first predetermined volume of said circumferentially sealed circular groove into at least one input chamber having a second volume and at least one discharge chamber having a third volume, said at least one input chamber opening into said inlet fluid aperture means, said at least one discharge chamber opening into said outlet fluid aperture means, each of said plurality of radially movable partition members selectively cooperating with said slidably movable reaction member to vary said second and third volumes as said rotor rotates relative to said stator; and

guide means guiding said plurality of radially movable partition members in said plurality of first and second radial slots such as to avoid interference with said slidably movable reaction member as said rotor rotates relative to said stator, said guide means moving each of said plurality of radially movable partition members radially outwardly away from said second plurality of radial slots such as to avoid said interference.

4,487,560

SCROLL FLUID COMPRESSOR WITH SURFACE FINISHED FLAT PLATES ENGAGING THE WRAPS

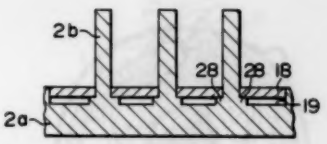
Naoshi Uchikawa; Mineo Takahashi, and Hiromu Watanabe, all of Shimizu, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 24, 1982, Ser. No. 410,953

Claims priority, application Japan, Sep. 22, 1981, 56-148831

Int. Cl.³ F04C *18/02, 29/00*

U.S. Cl. 418—55 **13 Claims**



1. A scroll fluid compressor comprising:

an orbiting member including an end plate and a wrap in vortical form integral with said end plate and located in an upstanding position on the end plate;

a stationary scroll member including an end plate and a wrap in vortical form substantially of the same construction as said end plate and said wrap of said orbiting scroll member, said wrap in vortical form being in mesh with said wrap of said orbiting scroll member when the two scroll members are assembled with each other;

a crankshaft having a shaft portion for supporting said orbiting scroll member for orbiting movement, said crankshaft having a balance weight formed integrally therewith;

a frame including a bearing means for journalling said crankshaft and formed so as to enclose said orbiting scroll member on an inner side thereof and bring the same into contact with said stationary scroll member;

means for preventing said orbiting scroll member from rotating on its own axis connecting said frame to said orbiting scroll member;

a rotor of a motor secured to said crankshaft;

a sealed vessel for housing said orbiting scroll member and having secured thereto a stator of said motor in a sealed condition and formed with an oil sump in a lower portion thereof;

oil feeding means located in an end portion of said crankshaft and immersed in said oil sump;

a fluid inlet line and a fluid outlet line communicating with spaces defined between said end plates of said orbiting scroll member and said stationary scroll member;

flat plates in vortical form each fitted in a valley between the outer wraps and the inner wraps of the oribiting scroll member and the stationary scroll member, said flat plates having surface finishes of higher precision than said end plates of said two scroll members, whereby said wrap of said orbiting scroll member can move in orbiting movement while having forward ends of the two scroll members maintained in sliding contact with the surfaces of the flat plates; and

stepped portions are formed on a bottom of the valleys so as to stably hold the flat plates in place.

4,487,561

ROTARY PISTON COMPRESSOR

Dankwart Eiermann, Lindau, Fed. Rep. of Germany, assignor to Wankel GmbH, Berlin, Fed. Rep. of Germany

Filed Sep. 30, 1982, Ser. No. 431,646

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1981, 3113233

Int. Cl.³ F04C *18/22*

U.S. Cl. 418—61 A **2 Claims**

1. In a rotary piston compressor, including:

a housing;

a casing arranged in said housing and having an inwardly directed, dual-arc trochoidal runway;

a shaft mounted in said housing and provided with an eccentric; and

a piston rotating on said eccentric, said piston having three corners and three flanks, each corner being provided with a groove which respectively contains a sealing strip, said sealing strips being in continuous contact with said runway of said casing; said piston, in the upper dead center position, forming a compression chamber ahead of a given

piston corner, when viewed in the direction of rotation of said piston, and forming a working chamber behind said last-mentioned piston corner; transfer recesses being provided in said housing for establishing a brief communication between an already closed-off trailing working chamber and a leading compression chamber; the improvement in combination therewith comprising two leading edges of each piston flank at each piston corner being bevelled radially inwardly and toward said groove of said piston corner respectively containing said sealing strip.

4,487,562

ROTARY VANE TYPE COMPRESSOR

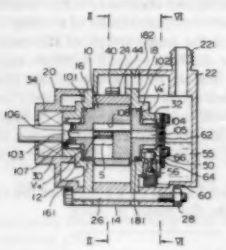
Mitsuo Inagaki, Okazaki; Kenji Takeda, Aichi, and Seitoku Ito, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Mar. 3, 1982, Ser. No. 354,435

Claims priority, application Japan, Mar. 23, 1981, 56-38927[U]; Mar. 23, 1981, 56-40408

Int. Cl.³ F04C *29/02*

U.S. Cl. 418—84 **5 Claims**



1. A rotary vane compressor comprising:

a casing assembly having an inner cylindrical surface of a predetermined profile;

a rotor member eccentrically arranged in the casing so that the rotor contacts the inner cylindrical surface of the casing;

a bearing means for rotatably supporting the rotor member in the casing assembly;

at least one vane plate;

said rotor member being provided with at least one slit extending radially through the rotor member, the vane plate being slidably inserted in the slit, the vane plate having ends which always contact the inner cylindrical surface of the casing assembly, so that compression chambers, the volume of each of which chambers increases and then decreases during each rotation of the rotor member, are formed between the casing assembly, the vane plate and the rotor member;

an inlet mean opened to the compression chambers which chambers increase in volume for the introduction of the cooling meduim in a gaseous state;

an outlet means opened to the compression chambers which chambers decrease in volume for the discharge of the cooling mediuni;

a separator means connected to the outlet means for sepatating the lubricant oil from the cooling medium;

said casing having an oil supply port means for the introduction of oil into the compression chambers, said port means being opened to the chambers at a position which is under a pressure near the intake pressure;

a passageway means connecting the separator means and the oil supply port means with each other for the transmission of oil from the separator to the port means, and

valve means for controlling the flow of fluid in said passageway means in accordance with the operating conditions of the compressor comprising a valve member movably arranged in the casing assembly, said valve member forming on one side a first chamber receiving the pressure in said bearing means and on the other side a second chamber receiving the pressure near the intake pressure, and means for forming a restricted orifice introducing the pressure in the separator means to said second chamber when the compressor is being operated.

4,487,563

OIL-FREE ROTARY DISPLACEMENT COMPRESSOR

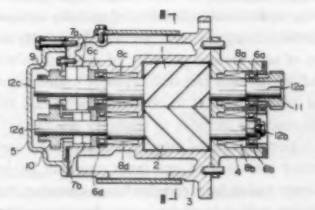
Hidetomo Mori, Ibaraki; Akira Suzuki, Atsugi; Riichi Uchida, and Shigeru Sasaki, both of Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 25, 1983, Ser. No. 516,912

Claims priority, application Japan, Sep. 17, 1982, 57-160976

Int. Cl.³ F01C *1/16*; F16J *9/04*

U.S. Cl. 418—201 **21 Claims**



1. An oil-free rotary displacement compressor comprising:

(a) casing means comprising a main casing defining a compression space, and a suction-side casing, connected to an end face of said main casing;

(b) a pair of rotors housed in said compression space, said pair of rotors each including a screw thread portion and shaft portions extending axially from said screw thread portion;

(c) radial bearing means comprising bearings each journalling one of said shaft portions of said rotors for rotation, said bearings each being interposed between one of said shaft portions of the rotors and said casing means;

(d) thrust bearing means interposed between at least the shaft portions located on the discharge side of the rotors and the casing means;

(e) suction-side seal ring means comprising floating type seal ring means interposed between the shaft portions located on the suction side of the rotors and the casing means, said floating type seal ring means each comprising a screw seal ring fitted over one of the suction-side shaft portions of the rotors and supported by said casing means for movement both in the radial and the axial directions with respect to the casing means, said screw seal ring being formed on its inner surface with a spiral screw thread and a root of thread; and

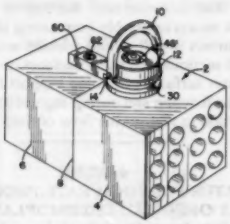
(f) discharge-side seal ring means comprising stationary type seal ring means supported between the shaft portions located on the discharge side of the rotors and the casing means, said stationary type seal ring means each comprising a screw seal ring fitted over one of the discharge-side shaft portions of the rotors and supported by said casing means for movement only in the axial direction with respect to the casing means, said screw seal ring being formed on its inner surface with a spiral screw thread and a root of thread.

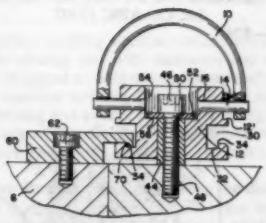
4,487,564

SPLIT MOLD LOCK

John W. Von Holdt, 6864 Lexington La., Niles, Ill. 60648

Filed Apr. 29, 1983, Ser. No. 490,180
Int. Cl.³ B29C 1/16
U.S. Cl. 425—451.9 **7 Claims**





1. A mold lock assembly for separable mold parts having a parting line between said mold parts of a mold assembly comprising:

a base means for attachment to one of at least two parts of separable mold assembly for molding articles,

lock means operatively coupled to each of the other of said at least two parts and being arranged to attain either a locked or released relationship with said base means, one of said base means and said lock means overlapping the parting line of adjacent parts, and

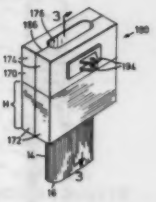
said base means having means to create said locked relationship between said lock means and said base means from said overlapping of the parting line during lifting of said base means for manipulating said mold assembly, said locked relationship preventing separation of said at least two parts.

4,487,565

APPARATUS FOR FORMING PAINT BRUSH HEADS

Gordon R. Simms, Westfield; Philip J. Allison, Renforth, and Cameron R. Benson, St. John, all of Canada, assignors to T. S. Simms & Co. Limited, Saint John, Canada

Filed May 12, 1982, Ser. No. 377,471
Int. Cl.³ B29C 1/00; B29D 3/00, 31/00
U.S. Cl. 425—115 **3 Claims**



1. A mold for use in molding a paint brush head which is suitable for subsequent attachment to a handle and which includes a bristle knot of a predetermined length comprising:

(a) a pair of mold forming assemblies disposed opposite one another and adapted to form a longitudinally elongated mold cavity therebetween, the mold cavity having an open upper end through which plastic material is admitted to the mold cavity in use and an open lower end through which a bristle knot projects in use,

(b) each of said assemblies being transversly subdivided along a part-line which extends transversly thereof along butting end faces and divides the mold cavity into upper and lower chambers which extend away from opposite sides of the part-line, said part-line also dividing the mold assemblies at the butting end faces to form an upper segment and a lower segment which are adapted to be retained in an end to end relationship, detent means on each segment projecting inwardly of the upper chamber and extending transversly of the longitudinal extent of the upper chamber to form recesses in the molded head of the paint brush, the lower segment having a length which is less than said predetermined length of said bristle knot such the bristle knot can be inserted into the lower chamber from one end to project through the other end thereof, and

(c) mounting means on each upper segment for use in mounting said segments on a conveyor for movement through a molding machine with the longitudinal extent of the mold cavity extending perpendicular to the direction of movement of the conveyor in use.

3. A mold for use in molding paint brush heads comprising:

(a) a pair of mold forming assemblies disposed opposite one another and adapted to form a mold cavity therebetween, the mold cavity having an open upper end and an open lower end,

(b) each of said assemblies comprising an upper segment and a lower segment which are adapted to be retained in an end to end relationship, the lower segment having a length through which a bristle knot can be inserted with ease,

(c) each lower segment is in the form of a continuous first belt having a forward run portion, the forward run portion of each first belt being disposed opposite the forward run portion of the other belt,

(d) divider means located between opposite faces of each forward run of said first belt at spaced intervals along the length thereof to form said mold cavities, and wherein;

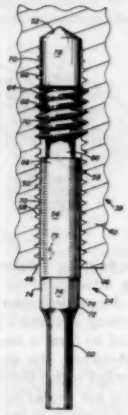
(e) each lower segment is in the form of a continuous second belt having a forward run portion, the forward run portions of each second belt being disposed opposite one another, the forward run portion of each second belt being disposed above the forward run portions of the first belts in an edge to edge relationship.

4,487,566

PUNCHING TOOL HAVING INTERCHANGEABLE PUNCHES

Alex J. Barna, 1212 Crawford St., Duquesne, Pa. 15110

Filed Jul. 11, 1983, Ser. No. 512,482
Int. Cl.[3] B26D 7/26; B26F 1/14
U.S. Cl. 425—193 16 Claims



1. A punching tool adapted to receive a replaceable punch comprising,

a punch holder having a body portion with one end portion and a second end portion,

a bore having an internally threaded portion of a preselected length and diameter extending from said one end portion into said punch holder to a closed end,

a punch having an elongated body of a preselected length including a shank portion positioned in said bore internally threaded portion and an end portion extending outwardly from said holder one end portion,

said punch shank portion having an externally threaded portion and a cylindrical portion,

said cylindrical portion being positioned between said shank portion threaded portion and said punch end portion,

said cylindrical portion being freely movable in said bore internally threaded portion,

said punch end portion including a torque receiving portion adjacent said cylindrical portion for rotatably advancing said punch shank portion into said bore internally threaded portion,

said bore internally threaded portion including internal threads having a preselected configuration formed by a plurality of thread roots being separated by crests, said crests having a cylindrical shape to form cylindrical bearing surfaces between said thread roots,

said punch portion shank externally threaded portion including threads having an enlarged thread configuration corresponding to the configuration of said bore internal threads to permit rapid engagement and disengagement of said punch shank portion externally threaded portion with said bore internal threads upon rotation of said punch end portion, and

said threads of said punch portion shank externally threaded portion being engageable with said bore internal threads such that said cylindrical bearing surfaces of said bore internally threaded portion receive said punch shank portion to stabilize said punch shank portion in said bore to assure positive engagement of said punch shank portion in said internally threaded bore and prevent damage to the meshing threads upon insertion and removal of said punch in said bore.

4,487,567

APPARATUS FOR MAKING A VASCULAR GRAFT

Zinon C. Possis, and Demetre M. Nicoloff, both of Edina, Minn., assignors to Possis Medical, Inc., Minneapolis, Minn.

Filed Mar. 24, 1983, Ser. No. 478,338
Int. Cl.[3] B29C 27/00
U.S. Cl. 425—403 17 Claims

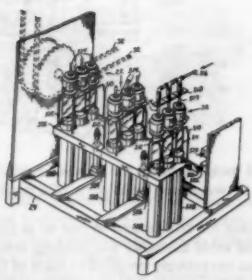
1. A mandrel assembly for use in forming and curing tubular member into a vascular graft having a section for restricting fluid flow through the graft comprising: a first mandrel member having a body and an end section located along a center line, said body and an end section having an outer surface, said end section and outer surface thereon having a cross sectional area smaller than the cross sectional area of the body, and outer surface thereon, a second mandrel member having a body and an end section located along a center line, said body and end section of the second mandrel member having an outer surface, said end section and outer surface thereon for the second mandrel member having a cross sectional area and shape substantially the same as the cross sectional area and shape of the end section and outer surface thereon of the first mandrel member, and means releasably connecting the first and second mandrel members in end-to-end relation and aligning the center lines, end sections, and outer surfaces of the mandrel members, said outer surfaces providing support for a tubular member during the forming and curing thereof into a vascular graft having a section to restrict the flow of fluid through the graft.

4,487,568

APPARATUS FOR HIGH RATE PRODUCTION OF BIAXIALLY ORIENTED THERMOPLASTIC ARTICLES

James G. Wiatt; James W. Calvert; Samuel L. Belcher, all of Cincinnati, and Roger D. Smith, Bethel, all of Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio

Division of Ser. No. 257,468, Apr. 24, 1981, Pat. No. 4,382,760.
This application Jan. 25, 1983, Ser. No. 460,829
Int. Cl.[3] B29C 17/07
U.S. Cl. 425—534 2 Claims



1. An apparatus for high rate production of hollow blow molded biaxially oriented articles from thermoplastic article preforms having a formable portion and a neck portion, the apparatus having a frame defining a path along which the preforms are moved and are located means for blow molding by biaxially expanding the formable portion when its temperature is at or near the molecular orientation temperature of the thermoplastic by injection therein of a pressurized fluid while releasably gripping the preform neck portion with a gripper

part of an article carrier means from which the expanded product is later released by a product eject means, the apparatus and eject means comprising

(a) said frame supporting said article carrier means and defining a path along which said carrier means moves such preforms past the blow molding means thence to the eject means; and

(b) said eject means including an article release mechanism for releasing the article from said carrier comprising

(1) a plate movably supported upon the frame to move between the carrier means when in the path and a rest position spaced apart from the carrier and the path,

(2) article guide means mounted upon the plate for receiving an article and directing the article out of the path upon release from the carrier, and

(3) gripper operating means attached to the plate for

(a) forcing the gripper into its article release condition when the plate is advanced toward the carrier, and

(b) permitting the gripper to return to its article retention condition when the plate has been retracted to its rest position and out of said path.

4,487,569

INJECTION MOLDING MACHINE WITH PIVOTABLE DIE CLOSING UNIT

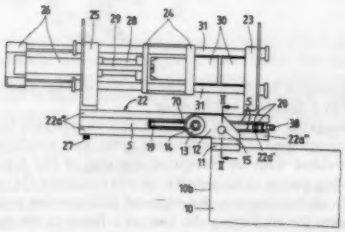
Karl Hehl, Arthur-Hehl-Strasse 32, 7298 Lossburg 1, Fed. Rep. of Germany

Filed Apr. 21, 1983, Ser. No. 487,251

Claims priority, application Fed. Rep. of Germany, Apr. 21, 1982, 3214728

Int. Cl.³ B29F *1/00*

U.S. Cl. 425—575 **17 Claims**



1. In an injection molding machine which has a machine base carrying a die closing unit with stationary and movable die carrier plates designed to hold the stationary and movable die halves of an injection molding die, and a drive assembly producing die opening and closing movements along the longitudinal center axis of the die closing unit which is defined by parallel tie rods guiding the movable die carrier plate, in such a machine,

a mechanism for pivotably repositioning the die closing unit between a normal horizontal orientation in which the injection molding die is injectable in an axial direction by means of an injection unit which is mounted horizontally on the machine base, in axial alignment with the die closing unit, and a vertical orientation in which the injection molding die is injectable in a radial direction by means of said horizontally mounted injection unit, said pivoting mechanism comprising in combination:

a pivot frame having two transversely spaced longitudinal frame members which are arranged below and in parallel alignment with said tie rods, the pivot frame being fixedly attached to the stationary structure of the die closing unit to form a rigid pivot assembly therewith;

two transversely spaced stationary pivot bearings arranged on an upper longitudinal extremity of the machine base, laterally outside said longitudinal frame members, the pivot bearings having axially aligned bores defining a fixed horizontal pivot axis on the machine base which extends transversely to the longitudinal center axis of the die closing unit and transversely to the said axial and radial directions of injection; and

two pivot shafts rotatably received in the bores of the two pivot bearings, the pivot shafts having inwardly extending shaft portions which form connections with said longitudinal frame members, thereby providing support for the pivot frame and the attached die closing unit; and wherein

the connections between the pivot shafts and the longitudinal frame members are shiftable longitudinally on said longitudinal frame members.

4,487,570

SMOKERS LIGHTER

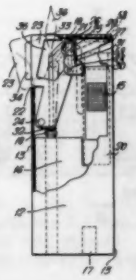
Hans Lowenthal, London, England, assignor to Colibri Lighters Limited, London, England

Filed Oct. 17, 1980, Ser. No. 197,827

Claims priority, application United Kingdom, Oct. 31, 1979, 7937673

Int. Cl.³ F23Q *2/08*

U.S. Cl. 431—130 **19 Claims**



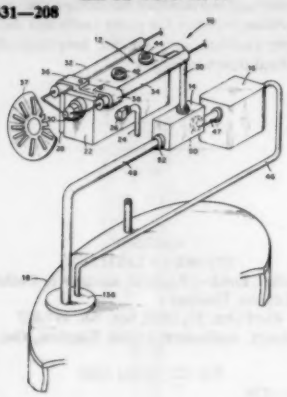
1. A smokers' lighter of the type having a casing which contains therein a burner nozzle through which fuel gas discharges from a fuel reservoir under control, of a burner valve, and having an actuatable electrical spark ignition system operative when actuated to ignite fuel gas discharged through the burner nozzle to form a flame: means defining a flame opening at the upper part of the casing at a junction of at least two faces of the casing and through which the flame projects during use of the lighter; a flame opening closure element having a normally closed position for substantially closing the flame opening and movable relative to the casing in a lateral direction with respect to the flame direction to an open position in which the closure element projects laterally of the casing for opening the flame opening and thereupon also providing a separate air inlet passage for admitting ignition air into the casing to an ignition zone in the vicinity and laterally of the burner nozzle; and manually-actuated means including an actuating member disposed at an outer surface of the casing and movable relative to the casing independently of the closure element for effecting movement of the closure element from its closed position to its fully open position in response to a first operative movement of the actuating member and for thereafter effecting actuation of the electrical spark ignition system to discharge an ignition spark in response to a subsequent second operative movement of the actuating member, the closure element remaining substantially stationary relative to the casing during the second operative movement of the actuating member.

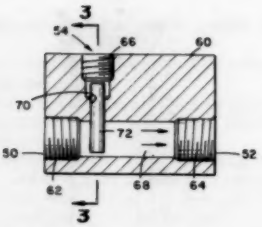
4,487,571

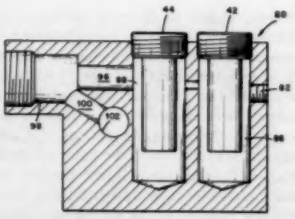
OIL COMBUSTION SYSTEM

Wayne Robertson, 1718 Linden Ave., Nashville, Tenn. 37212; Eugene C. Briggs, and Keith E. Briggs, both of 1609 Harmony Way, Bowling Green, Ky. 42101

Filed Nov. 22, 1982, Ser. No. 443,441
Int. Cl.³ F23D *11/44*
U.S. Cl. 431—208 **16 Claims**







1. An oil combustion system for transmitting and burning oil from a reservoir comprising:

a pressure reducing fitting having at least one high pressure input, at least one low pressure output and at least one other output and being operable, when oil under pressure is supplied to the high pressure input, to transmit oil to the low pressure output and to reduce the pressure of the oil at the low pressure output relative to the oil pressure at the high pressure input, said low pressure output being disposed between said high pressure input and said other output with said low pressure output being downstream from said high pressure input and upstream from said other output;

means for supplying oil under pressure to the high pressure input of the pressure reducing fitting;

first oil conduit means having first and second ends and being connected at the first end thereof to the low pressure output of the pressure reducing fitting;

second oil conduit means connected to transfer oil from said other output to the oil reservoir;

venturi means disposed within said pressure reducing fitting for generating by a venturi effect a low pressure volume of oil adjacent said low pressure output relative to the oil pressure at said input; and

siphon nozzle means connected to receive oil through the second end of said oil conduit means for siphoning oil from the low pressure output of said pressure reducing fitting through said oil conduit means and for atomizing the oil to prepare it for burning.

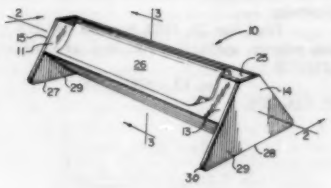
6. The system of claim **1** further comprising a positive temperature co-efficient thermistor attached to said siphon nozzle means for heating the oil prior to burning it.

4,487,572

FIREPLACE FIRE STARTER

Ronald G. Parker, Box 12, #3 Susie Circle, Electra, Tex. 76360

Filed Sep. 24, 1979, Ser. No. 78,062
Int. Cl.³ F23D *5/02*
U.S. Cl. 431—331 **4 Claims**



1. Apparatus for starting a fire in a bed of logs positioned on a grate in a fireplace comprising:

an elongated container for flammable vaporizable liquid fuel proportioned to fit under said grate, said container being provided with an elongated opening at the top thereof giving access to the interior of said container for introduction of fuel thereto, the edges of said opening comprising means for anchoring the base of a flame at the opening;

said container having walls formed from a heat-conducting material for transferring heat from a flame established at said opening to a body of liquid fuel in said container to form a vaporization means to continuously vaporize fuel from said body and to deliver the fuel vapor so formed to the base of said flame to sustain it, whereby the fuel supply to said flame is sustainable in the absence of any wick once said vaporization means is brought to operating temperature;

said container being positionable beneath a fireplace grate with said elongated opening extending generally crosswise of the fireplace, and when so positioned, having an elongated wall extending downwardly from said opening toward the front of said fireplace to thereby establish with superjacent logs on said grate a restricted air flow passage between said opening and said logs which accelerates the flow of air therethrough to spread a flame established at said opening both longitudinally and laterally under said logs; and

a base which is greater in transverse dimension than the remainder of the container to provide resistance to overturning of the container upon application of a moment tending toward overturning the container applied in the transverse direction; said base comprising two transverse runners, one adjacent each end of the container, said runners being proportioned to plough into a bed of ashes in said fireplace upon translation of the container into the fireplace beneath the grate.

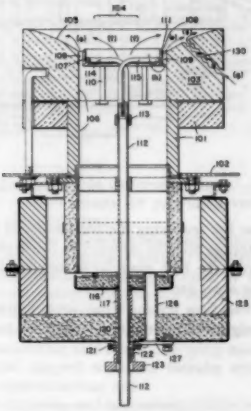
4,487,573
BURNER

Chad F. Gottschlich, Philadelphia; Leland H. S. Roblee, Jr., Ambler, both of Pa.; Howard H. Seemann, Seaford, N.Y.; William G. Bates, Sellersville, and Richard F. Spahr, Ambler, both of Pa., assignors to Selas Corporation of America, Dresher, Pa.

Continuation of Ser. No. 122,844, Feb. 20, 1980, abandoned. This application Aug. 10, 1982, Ser. No. 406,876

Int. Cl.³ F23D *13/12*

U.S. Cl. 431—348 **1 Claim**



1. In a vortex burner having a burner block with a generally longitudinally extending opening, said block having a cup therein at the outer end of said opening, a cylindrical sleeve positioned in said opening for feeding combustion supporting air therethrough, said sleeve containing a fuel supply means for conveying fuel to a position within the sleeve and whirling the fuel against the inner wall of the sleeve, the improvement comprising the combination of:

(a) said cup having an outwardly convex curvature forming a surface along which the combustion products flow in a radially outward direction from said opening, the surface causing the radially flowing combustion products to form a negative pressure in the cup;

(b) the length of said sleeve being substantially less than said burner block opening, the outer dimension of the sleeve being smaller than the inner dimension of the burner block opening thereby providing an annular passageway between them;

(c) means forming an air passage in communication with the inner end of the opening in said burner block; and

(d) said sleeve having a central opening in communication with said air passage and having a thin beveled edge on its outer portion extending slightly beyond the outer end of the opening in said burner block so that a low pressure region is formed by said thin edge.

4,487,574
SWITCHING DEVICE FOR PHOTOFLASH UNIT

Mary S. Jaffe, Cleveland Heights, Ohio, and Vaughn C. Sterling, Mattoon, Ill., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 20, 1982, Ser. No. 451,505

Int. Cl.³ F21K *5/02*

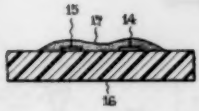
U.S. Cl. 431—359 **7 Claims**

1. A photoflash lamp unit comprising:

(a) a pair of low voltage type flashlamps,

(b) an electrical circuit into which said lamps are arranged to fire individually and in sequence, and

(c) a solid state radiant energy switching device located external of the lamps and forming part of the electrical circuit, said switching device being located adjacent one of said lamps and disposed to receive radiant energy emitted by that lamp, said photoflash unit being characterized by said flashlamps being actuated by a low voltage firing pulse and by said switching device comprising a particulate mixture in weight percent approximately 51–72% silver oxide, approximately 20–36% powdered metal exhibiting thermal and electrical conductivity which does not react exothermally with said silver oxide and further including approximately 8–13% high relative humidity resistant organic polymer binder mixture, said mixture having one organic polymer serving as a fuel during conversion of the silver oxide along with another organic polymer binder more resistant to combustion and serving to provide adhesive bonding action after said conversion takes place.



4,487,575
METHOD AND APPARATUS FOR MONITORING ROTARY DRUMS DURING THERMAL PROCESSING

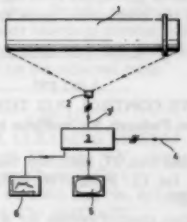
Gernot Jäger, Cologne; Hubert Spitz, Overath, and Herbert Specht, Taunusstein-Neuhof, all of Fed. Rep. of Germany, assignors to Klöckner-Humboldt-Deutz AG, Fed. Rep. of Germany

Filed Mar. 3, 1983, Ser. No. 471,703

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1982, 3209191; Sep. 30, 1982, 3236215

Int. Cl.³ F27B *1/26;* **F27D** *19/00;* **F23N** *1/00*

U.S. Cl. 432—1 **17 Claims**



1. A method for monitoring the operation of a rotary drum while engaged in thermal processing of fine grained materials comprising

scanning the infrared radiation from said drum at a scanning angle sufficient to cover the entire axial length of said drum from a stationary point outside said drum,

comparing the derived scanning results with other parameters related to the thermal processing, including rate of fuel feed, rate of raw material input, drum speed and driving power to said drum, and

comparing the measured values with the temperature sensed by a reference source subjected to the same conditions as in the scanning.

4,487,576

HIGH-TEMPERATURE, HIGH-PRESSURE ARTICLE TREATMENT APPARATUS, AND METHOD

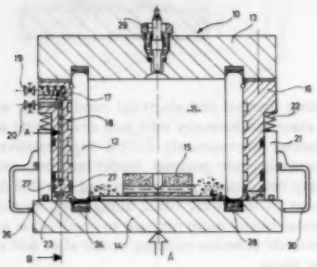
Helmut Martini, Weil der Stadt, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jan. 26, 1983, Ser. No. 461,185

Claims priority, application Fed. Rep. of Germany, Feb. 12, 1982, 3204995

Int. Cl.[3] **F27D** *7/00*; **F27B** *5/16*; **F23G** *7/00*; **F23C** *11/04*

U.S. Cl. 432—25 **15 Claims**



14. Method of applying high-temperature, high-pressure shocks to an article within an article treatment chamber comprising the steps of

locating said article on a support end plate (**14**);

placing a tubular-bell-shaped chamber forming wall including an outer wall structure (**21**) over said end support plate (**14**) to thereby separate said chamber from the outer atmosphere;

positioning an inner wall structure within the outer wall structure;

separating the inner wall structure from the support plate (**14**) by a gap (**23**);

introducing combustion gases and oxygen gas within the outer wall structure (**21**), and conducting said gas through said gap (**23**) within the chamber (**11**);

and then closing the inner wall structure (**12**) and sealing the inner wall structure against the support plate to sever connections of gas supply from the chamber;

and igniting the combustion gases and oxygen within the chamber.

4,487,577

ADAPTIVE CONTROL FOR THERMAL DRYER

John A. Watson, Paducah, Ky., assignor to Lecorp, Inc., Lexington, Ky.

Filed Oct. 27, 1982, Ser. No. 437,138

Int. Cl.[3] **F27B** *7/00*; **F26B** *3/08*

U.S. Cl. 432—37 **5 Claims**

1. An adaptive control system for a bulk material drying system, comprising:

(a) a thermal dryer for drying bulk material;

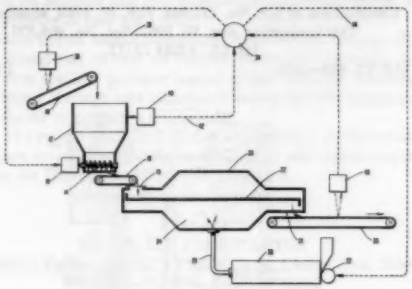
(b) means for substantially continuously moving a quantity of bulk material through the thermal dryer from a position upstream of the dryer to a position downstream of the dryer;

(c) means associated with said thermal dryer for removing moisture from the bulk material at a variable rate as the material is moved through the dryer;

(d) means located upstream of the dryer for sensing the thermal load to be placed on the dryer including the moisture content and the mass flow of a selected quantity of material upstream of the dryer;

(e) means responsive to said sensing means for adjusting the rate of the moisture removing means to accommodate the sensed thermal load of the selected material as the selected material is moved through the dryer;

(f) a temporary storage area for holding the bulk material after its thermal load is sensed but prior to entering the dryer;



(g) means for removing the bulk material from the temporary storage area for delivery to the dryer at the approximate rate the bulk material is supplied to the temporary storage area; and

(h) said mass flow sensing means including means for sensing the weight of the bulk material in the temporary storage area.

4,487,578

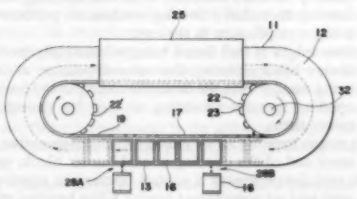
CONTINUOUS FIRING EQUIPMENT

Kikuo Wakino, Muko; Kiichi Minai, Shiga, and Hiroshi Seno, Kyoto, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Oct. 19, 1982, Ser. No. 435,231

Int. Cl.[3] **F27B** *9/26*, *9/06*

U.S. Cl. 432—137 **8 Claims**



1. The combination including continuous firing equipment and ceramic products fired thereby, said ceramic firing equipment comprising:

a furnace body equipped with electrical heating equipment means;

a horizontally looped track extending through said furnace body;

a plurality of cars made of a metal material having a small heat capacity and a high resistance to thermal shocks arranged all along the track so as to travel on the track;

a plurality of saggars made of a ceramic wool material and removably located on said cars, said saggars supporting said ceramic products; and

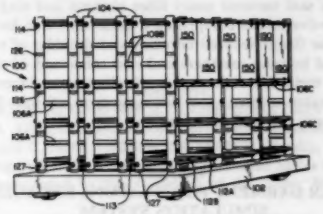
means for driving said cars, said driving means comprising a looped driving member arranged along a circumference of said track and coupled to said cars.

4,487,579

SUPERSTRUCTURE FOR KILN CAR

David M. Irwin, East Liverpool, Ohio, assignor to The Potters Supply Company, East Liverpool, Ohio

Filed Dec. 5, 1983, Ser. No. 558,261
Int. Cl.[3] F27D 3/12, 5/00; F27B 9/26
U.S. Cl. 432—241 20 Claims



1. A superstructure for a kiln car comprising:

hollow vertical support means for providing vertical support for said superstructure;

horizontal tying means extending into said hollow vertical support means for spacing said vertical support means to define said superstructure, selected ones of said tying means further providing generally horizontal supports for article receiving shelf means;

interlock means disposed within said hollow vertical support means for interlocking said horizontal tying means to said hollow vertical support means to thereby stabilize and rigidify said superstructure; and

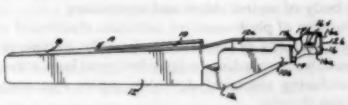
shelf means for receiving and supporting articles within said superstructure, said shelf means being supported upon said selected ones of said tying means and being formed to engage said vertical support means to stabilize said shelf means.

4,487,580

ORTHODONTIC BRACKET HOLDER

William V. Ridgeway, 3245 E. 1st St., Long Beach, Calif. 90803

Filed Feb. 23, 1984, Ser. No. 583,015
Int. Cl.[3] A61C 7/00
U.S. Cl. 433—3 4 Claims



1. In combination with an orthodontic bracket of the type that includes a base that has a flat rearward surface that may be bonded to a tooth and gingival occlusal wing means disposed outwardly from said base, said wing means defining two spaced end edges of concave arcuate shape that curve inwardly towards one another, the combination with said orthodontic bracket of a holder for removably engaging the same and moving it to a position where said base may be bonded to said tooth, said holder including:

a. a pair of elongate resilient members that have first and second end portions, said first end portions in abutting bonded engagements, and said second portions defining a pair of interior surfaces that said resilient members tend to maintain in pressure contact; and

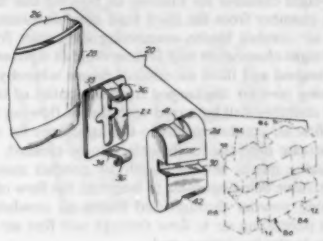
b. a pair of rigid bodies secured to said pair of interior surfaces, said pair of bodies including flat side surfaces and adjacently disposed end surfaces of convex shape that curve away from one another, said pair of elongate members when manipulated to dispose said side surfaces in contact with said base and said end surfaces in pressure contact with said end edges permitting said orthodontic bracket to be moved to a position where it may be bonded to said tooth.

4,487,581

ORTHODONTIC BRACKET

Theodore Adler, 146 Soundview Ave., White Plains, N.Y. 10605

Filed Sep. 30, 1982, Ser. No. 429,201
Int. Cl.[3] A61C 7/00
U.S. Cl. 433—16 14 Claims



1. A two-piece orthodontic bracket comprising:

outer base means for securing the bracket to a tooth;

wire gripping means;

said outer base means including means for releasably securing the wire gripping means to said base means;

alignment means for aligning said gripping means with said base means upon engagement of said gripping means with said base means;

said gripping means being in the form of an inner block adapted to engage and grip the orthodontic wire, said releasably securing means being in the form of flexible tabs extending from a central portion of said base means, and said inner block includes tab receiving slots for receiving said flexible tabs; and

said alignment means comprising a key extending from a back face of said inner block and a keyway formed within said central portion of said base means for receiving said key and providing accurate alignment upon assembly of said inner block to said outer base means; whereby said inner block is frontally inserted and positioned within said outer base means with the flexible tabs biasingly engaging said tab receiving slots, thereby enabling the easy interchangeability of inner blocks as desired without interference with adjacent teeth and any orthodontic bracket assembly mounted on the adjacent teeth.

4,487,582

DENTAL CLEANING SYSTEM

George E. Warrin, North Merrick, N.Y., assignor to Cooper LaserSonics, Inc., Santa Clara, Calif.

Filed Feb. 18, 1983, Ser. No. 467,816
Int. Cl.[3] A61C 3/02
U.S. Cl. 433—88 16 Claims

1. In a system for cleaning teeth in which a stream of air and entrained cleaning powder particles and a separate stream of water are directed against the tooth surface to be cleaned from a nozzle assembly in a manually controlled handpiece, the system including a fluid-tight chamber for containing a supply of cleaning powder from which the powder is discharged in an air stream from an opening in the chamber above the cleaning powder supply, said system comprising, in combination,

first air conduit means for supplying air under pressure to the handpiece,

second air conduit means connected to said first fluid conduit for directing a stream of air under pressure from the first air conduit means into the bottom portion of the fluid-tight chamber for entraining cleaning powder into

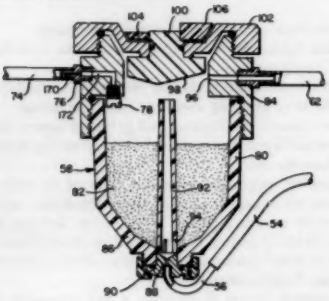
the stream to be discharged through the outlet opening in the fluid-tight chamber,

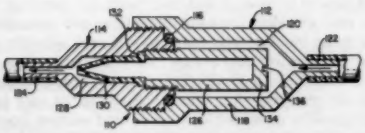
third air conduit means connected to said first fluid conduit means and to the fluid-tight chamber for directing a flow of air from the first air conduit means into the chamber at a point above the level of cleaning powder in the chamber, said third air conduit means including flow restricter means for limiting the flow of air therethrough,

first air fiiter means connected in fluid communication with the third fluid conduit means and being located within said fluid-tight chamber for filtering air flowing into the fluid-tight chamber from the third fluid conduit means,

fourth air conduit means connecting the outlet from said fluid-tight chamber to said first air conduit downstream of said second and third air conduit means whereby air and cleaning powder discharged from the outlet of the fluid-tight chamber will be mixed with the air flowing through said first air conduit means to the handpiece for delivery in a stream onto the tooth surface to be cleaned,

pinch valve means in said fourth air conduit means, said pinch valve being operable to interrupt the flow of air and cleaning powder through said fourth air conduit means while permitting air to flow through said first air conduit means to the handpiece, and





first and second one-way filter means connected in said first and in said second air conduit means, respectively, said one-way filter means each including check valve means operable to prevent the reverse flow of air through the filter.

16. For use in a dental cleaning system in which a stream of air having cleaning powder particles entrained therein and a separate stream of water are directed against a tooth surface to be cleaned and including a conduit system for supplying air under pressure to a manually controlled handpiece to convey and discharge the cleaning powder, an improved one-way renewable air filter comprising:

an elongated fluid-tight housing having an inlet and an outlet and an air flow path extending through the housing from the inlet to the outlet, said housing including first and second generally cup-shaped housing members each having one open end with said inlet and said outlet, respectively, being formed one in the end of each said housing member for releasably joining the housing members together to form said fluid-tight housing;

a sintered metal filter element removably mounted within said housing in said fluid flow path, said filter element capable of being cleaned and reused, said filter element comprising an elongated substantially tube member having one and closed by an integrally formed end wall and having male threads on its external surface adjacent the other end thereof, and wherein one of said housing members includes female threads adapted to engage the male threads on said filter element to releasably mount the filter element in said housing and wherein said one of said housing members including female threads further includes a shoulder formed therein; and

one-way check valve means mounted in said housing between said sintered metal filter element and said outlet, said valve means comprising a duck-bill valve having an annular flange secured between said shoulder of said one of said housing members and said other end of said sintered metal filter element for facilitating replacement of said valve means upon disengagement of said housing members and said filter element.

4,487,583

RECEIVER GARMENT FOR WEAPONS ENGAGEMENT SIMULATION SYSTEM

Stephen E. Brucker, Albuquerque, and Larry K. Blankenship, Sandia Park, both of N. Mex., assignors to Jaycor, San Diego, Calif.

Filed Jun. 15, 1981, Ser. No. 273,774
Int. Cl.³ F41J 5/02
U.S. Cl. 434—22 **9 Claims**

1. A receiver garment for a weapons engagement simulation system wherein a weapon simulator includes a laser transmitter for transmitting pulses of directed coherent light in a characteristic temporal pattern, said receiver garment being formed to be disposed over at least a substantial portion of the front upper body of an individual and comprising

a plurality of photosensitive detectors distributed over each of a plurality of discrete zones on the outside of the garment for responding to light from said laser transmitter by producing electrical detection pulses systematically related thereto,

a plurality of discriminating means each responsive to said electrical detection pulses from the photosensitive detectors in a respective zone for comparing the magnitude of said electrical detection pulses with a predetermined threshold level and producing discriminated detection pulses when said electrical detection pulses are greater than said threshold level,

decoder means responsive to said discriminated detection pulses for comparing the temporal pattern of said discriminated detection pulses with a temporal pattern characteristic of the laser transmitter and producing a hit signal corresponding to a respective corresponding zone when the compared patterns correspond,

visual indicating means disposed in each zone for providing a visual signal when actuated, and

actuating means responsive to said hit signals for actuating respective visual indicating means, wherein said actuating means includes priority means responsive to hit signals corresponding to respective zones in accordance with predetermined priority preassigned to respective zones for providing an actuating signal corresponding to a hit signal from a zone having the highest priority, and means for

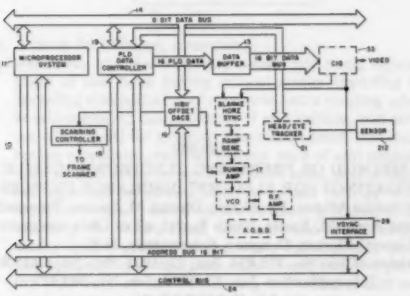
applying said actuating signal to the visual indicating means disposed in the respective zone.

4,487,584

RASTER SHIFTING DELAY COMPENSATION SYSTEM

John H. Allen, Orlando; Joseph Portoghese, Altamonte Springs; Richard C. Hebb, Orlando, and Denis R. Breglia, Altamonte Springs, all of Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 17, 1982, Ser. No. 442,410
Int. Cl.³ G09B 9/00
U.S. Cl. 434—44 **14 Claims**



1. An apparatus for compensating for angular displacement of a visual scene from a helmet mounted projector, said projector utilizing a raster scan having distinct vertical and horizontal scan means to project said visual scene generated by a computer image generator in accordance with positional data output by a pilot look direction tracker, comprising in combination:

means for interfacing with said tracker to receive positional data therefrom, said interfacing means having storage capacity for said data and output for said data,

means for determining compensatory angular displacement values based on iterative comparisons of said positional data, including a microprocessor, operably connected to receive data from said interfacing means and to output said displacement values, said microprocessor having inputs for receiving instructions, memory means containing instructions for said microprocessor operably connected thereto for providing thereto said instructions, and memory means for storage of positional data and initial condition data for processing by said microprocessor operably connected thereto for providing said data to said microprocessor;

means for inputting displacement values into said horizontal and vertical scan means operably connected to receive said values from said determining means;

means for inputting said positional data to said CIG operably connected to said interface means; and

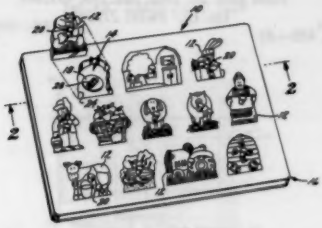
means for synchronizing said value input means with said CIG, thereby presenting continuous display operably connected to said CIG data input means, value input means, said determining means, said interface means, and said tracker.

4,487,585

EDUCATIONAL TOY HAVING FRAGRANCE ASSOCIATION MEANS

Edward M. Goldwasser, Los Angeles, Calif., assignor to Small World Toys, Culver City, Calif.

Filed Jan. 24, 1984, Ser. No. 573,426
Int. Cl.³ G09B 1/06; A63F 9/10
U.S. Cl. 434—259 **18 Claims**



1. An educational toy for children, comprising:

a game board having a plurality of open recesses formed therein of generally different shapes;

a plurality of game pieces of generally different shapes for respective seated reception into the recesses in said game board, each of said game pieces embodying recognizable and generally different subject matter; and

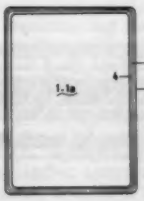
a plurality of fragrance-emitting members each associated with a different one of said plurality of game pieces and adapted to emit a fragrance correlated with the recognizable subject matter embodied by the associated one of said game pieces, each of said fragrance emitting members being mounted in a position concealed from view when the associated one of said game pieces is seated within the respective one of said game board recesses.

4,487,586

FRAMED BOARD WITH WRITING SURFACE

Jos Palmans, Sint-Huibrechts-Lille, Belgium, assignor to Alliance Europe S.A., Belgium

Filed Nov. 12, 1982, Ser. No. 440,948
Claims priority, application Luxembourg, Dec. 16, 1981, 83839
Int. Cl.³ A47G 1/06
U.S. Cl. 434—408 **6 Claims**



1. Apparatus comprising a board, a frame for said board, and a complementary border forming an inseparable entity with said board and frame, said board being intended to be used as writing surface, said frame being continuous all around the periphery of said board and being formed with at least two flanges disposed at an angle relative to each other, one of said flanges supporting one face of the board and the other flange being formed with an inwardly projecting rim, the complementary border having a U-section including two arms which bear against the other face of the board, one of said arms being formed with an outwardly projecting foot, said rim engaging said foot to lock said border to said frame, at least one of the

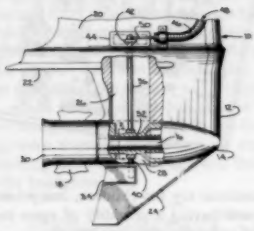
flanges providing elasticity, so that the frame, after the board has been inserted therein, grips the board securely.

4,487,587

SKEG MOUNTED VANE STEERING SYSTEM FOR MARINE DRIVES

David G. Friedel, and John J. Litjens, both of Oshkosh, Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Dec. 20, 1982, Ser. No. 451,609
Int. Cl.³ B63H 21/26
U.S. Cl. 440—51 **11 Claims**



1. In a steerable marine drive pivotally mounted on the transom of a boat and having a non-rotatable skeg extending below a drive shaft member for a propeller, an improved steering system comprising:

a steering vane mounted in the non-rotatable skeg and positioned completely below the propeller drive shaft member, said steering vane being rotatable with respect to the marine drive; and

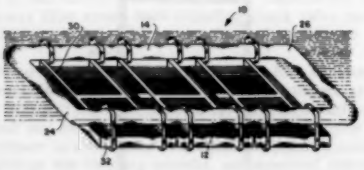
means coupled to said vane for rotating same with respect to the marine drive to generate hydrodynamic steering forces on the marine drive.

4,487,588

SUBMERSIBLE RAFT FOR THE CULTIVATION OF PLANT LIFE

Roy R. Lewis, III, Tampa, and James A. Derrenbacker, Jr., Lutz, both of Fla., assignors to Mangrove Systems, Inc., Tampa, Fla.

Filed Aug. 10, 1982, Ser. No. 406,773
Int. Cl.³ B63C 9/04
U.S. Cl. 441—43 **31 Claims**



1. A submersible raft for the cultivation of plant life comprising in combination:

a first longitudinal member of tubular configuration;

a second longitudinal member of tubular configuration;

said first longitudinal member including a first and a second end;

said second longitudinal member including a first and a second end;

a first transverse member extending between said first ends of said first and said second longitudinal members;

a second transverse member extending between said second ends of said first and said second longitudinal members;

said first and said second longitudinal members and said first and said second transverse members defining a substantially rectangular aperture therebetween, said first and said second longitudinal members being of plastics material;

a cradle extending between and supported by said first and said second longitudinal members, said cradle including an upper and a lower framework, said upper and said lower frameworks being of H-shaped configuration and of substantially the same proportions as each other;

upright members extending between corresponding free ends of said H-shaped frameworks;

extensions of said upright members extending upwardly from said upper frameworks;

a loop shaped member connected to each of said extensions, said loop shaped member encircling one of said longitudinal members such that said loop shaped member and said cradle are moveable longitudinally relative to said rectangular aperture; and

a tray supported by said cradle, said tray being supported below said rectangular aperture, said tray being supported between said upper and said lower frameworks which define therebetween an opening for the reception of said tray.

4,487,589

METHOD OF PREPARING ELECTRON EMISSIVE COATINGS FOR ELECTRIC DISCHARGE DEVICES

Amarendra Mishra, Lyndhurst; Dimitri M. Speros, Painesville, and Roger M. Eastin, South Euclid, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 275,834, Jun. 22, 1981, Pat. No. 4,415,835.
This application Jun. 13, 1983, Ser. No. 503,927
Int. Cl.³ H01J 9/04
U.S. Cl. 445—51 **1 Claim**

1. An improved method of forming an electric discharge cathode member for an electric discharge lamp which comprises:

(a) applying a liquid suspension of refractory metal particles selected from tungsten and tantalum metals, including mixtures thereof with an organic binder to a refractory metal substrate at a coating thickness not to exceed about one millimeter thickness,

(b) sintering said refractory metal particles in a reducing atmosphere at an elevated temperature of at least 1800° C. to form a porous coating adhered to said refractory metal substrate, and

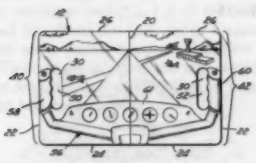
(c) impregnating the porous coating with a liquid suspension containing Cs_2MoO_4 emission material in alcohol.

4,487,590

CHILDREN'S BOOKS

James F. Becker, 3008 3rd St., Apt. A, and Andrew S. Mayer, 706½ Ashland Ave., both of Santa Monica, Calif. 90405

Filed Jan. 3, 1983, Ser. No. 455,029
Int. Cl.³ A63H 3/00
U.S. Cl. 446—147 7 Claims



1. A book for children, comprising:

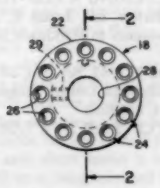
plural sheets, bound at a binding to form said book, adjacent pages of said book having printed matter depicting the operating compartment of a vehicle and a steering wheel in said operating compartment of said vehicle, said steering wheel sized for gripping by a child's hand, said sheets having respective openings therein, each of said openings sized to receive the fingers of a child's hand, at least one of said openings positioned adjacent to said steering wheel depicted by said printed matter to allow gripping of said wheel by the child's hand, with a portion of said printed matter depicting said steering wheel between said one of said openings and a marginal edge of said book, to permit the child to pretend he is driving said vehicle, said marginal edge opposite the binding of said book.

4,487,591

FLEXIBLE COUPLING

Dennis G. Berg, East Rockaway, N.Y., assignor to Winfred M. Berg, Inc., East Rockaway, N.Y.

Continuation of Ser. No. 686,012, May 13, 1976, abandoned, which is a continuation of Ser. No. 493,466, Jul. 31, 1974, abandoned. This application May 4, 1979, Ser. No. 36,140
Int. Cl.³ F16D 3/00
U.S. Cl. 464—85 4 Claims



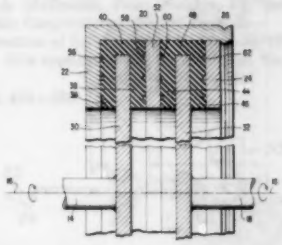
1. A flexible coupling for connecting a pair of shafts comprising the combination of a first hub on the end of one shaft, a second hub on the end of the second shaft, said hubs being similar and each of said hubs having a ring-like flange with a plurality of equally spaced finger seating apertures therein with curved walls; a plurality of flexible plastic fingers with each one extending through a finger seating aperture in one hub and through an opposite finger seating aperture in the other hub and being in sliding engagement with the walls of both apertures, and similar projecting heads on the opposite ends of each finger whereby the hubs are permitted to slide inwardly of the fingers toward each other between the projecting finger heads.

4,487,592

VIBRATION ISOLATOR COUPLING

Dennis L. Strader, Fishers, Ind., assignor to Household Manufacturing Inc., Prospect Heights, Ill.

Filed Jun. 8, 1983, Ser. No. 502,130
Int. Cl.³ F16D 3/17, 3/28
U.S. Cl. 464—88 6 Claims



1. A torsional vibration isolator coupling for obtaining a substantially torsional vibration free output torque from an input torque having torsional vibrations, such as an input torque derived directly from an internal combustion engine, the coupling including, an input torque disc formed of rigid material and adapted to be coupled to an input torque shaft, an output torque disc formed of rigid material and adapted to be coupled to an output torque shaft, the two discs being parallel and coaxial with each other, an annular elastomer band on the two faces of each disc, each elastomer band being contiguous to the periphery of its respective torque disc and extending radially inwardly from said periphery, to thereby define four axially spaced elastomer bands, a first pair of which sandwiches a radially outermost portion of the input torque disc and a second pair of which sandwiches a radially outermost portion of the output torque disc, a rigid elastomer band separator disc axially intermediate the two torque discs and axially positioned between the two axially innermost elastomer bands, the rigid band separator disc being of substantially the same radial extent as the two elastomer discs which axially sandwich it, a rigid annular retainer, the annular retainer being in the form of a cylinder having rigid, radially extending flanges at its ends, said flanges contacting and abutting the two axially outermost elastomer bands to thereby axially clamp and axially compress the elastomer bands against the two torque discs, whereby at least four radially extending, elastomer to rigid member interfaces are defined.

4,487,593

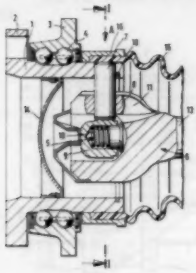
BEARING ASSEMBLY

Welschof Hans-Heinrich, Rodenbach, Fed. Rep. of Germany, assignor to Lohr & Bromkamp GmbH

Filed Nov. 3, 1981, Ser. No. 317,608
Claims priority, application Fed. Rep. of Germany, Nov. 6, 1980, 3041855
Int. Cl.³ F16D 3/20
U.S. Cl. 464—111 2 Claims

1. A bearing assembly of a wheel hub for a motor vehicle wheel, comprising an outer bearing ring adapted to be affixed with a vehicle chassis; an inner bearing ring having first and second ends, said first end adapted to be connected to said wheel and said second end forming an annular end face, said inner bearing ring having an axis of rotation; said outer bearing ring concentrically surrounding said inner bearing ring so that

said inner bearing ring rotates within and is guided by said outer bearing ring; rotary joint means connected to said inner bearing ring for driving the wheel hub, said rotary joint means including a first joint member and a second joint member, said first joint member having three pins extending radially relative to said axis of rotation and uniformly spaced in a star-like configuration in the circumferential direction of said joint means and secured to said first joint member; said inner bearing ring defining recesses in said end face and extending in the



direction of said axis of rotation for receiving said pins and including removable securing means for axially securing said pins in said recesses; said second joint member being adapted to be connected to a drive shaft and having three rolling tracks formed therein; and three annular rolling bodies having spherically shaped outer surfaces; each said rolling body being separately supported on one of said pins and being received in said rolling tracks of said second joint member, said inner bearing ring defining a bore for receiving said first joint member.

4,487,594

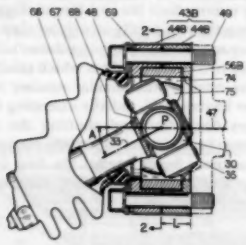
HOMOKINETIC UNIVERSAL JOINT

William F. Sindelar, 8009 York Rd., Towson, Md. 21204

Filed Jun. 29, 1983, Ser. No. 509,042

Int. Cl.³ F16D *3/22, 3/26*

U.S. Cl. 464—123 **14 Claims**



1. A homokinetic universal joint comprising:

a first joint half, having a first axis of rotation;

four radially extending, coplanar, mutually perpendicular trunnions formed on the first joint half;

four spherical rollers rotatably mounted on the trunnions and fixed against axial movement thereon;

a second joint half, having a second axis of rotation;

four intermediate members, each member having an axially extending groove formed therein; each groove defining an axially and radially extending median plane;

the rollers contained in the grooves for rolling and oscillatory movement therein; and

means joining the four intermediate members to the second joint half so that the median planes are mutually perpendicular; any two adjacent median planes intersecting in a vertex, forming a first vertex line and a first vertex angle; the remaining two adjacent median planes forming a second vertex line and a second vertex angle; said means constraining the intermediate members to move relative to each other and to the second axis of rotation, while maintaining the mutual perpendicularity of the four median planes, when the joint rotates with the first axis of rotation angularly disposed to the second axis of rotation.

4,487,595

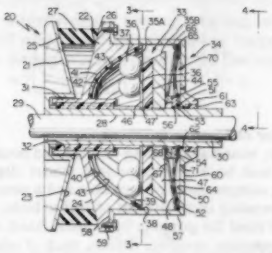
PULLEY CONSTRUCTION FOR A V-BELT AND METHOD OF MAKING THE SAME

Terrence R. Quick, and Larry R. Oliver, both of Springfield, Mo., assignors to Dayco Corporation, Dayton, Ohio

Filed Dec. 13, 1982, Ser. No. 449,045

Int. Cl.³ F16H *55/52*

U.S. Cl. 474—15 **20 Claims**



1. In a pulley construction having a pair of opposed flanges respectively provided with surface means for engagement with a V-belt construction when said V-belt construction is disposed therebetween, said pulley construction having speed responsive means for moving one of said flanges axially relative to the other of said flanges, said speed responsive means comprising raceway means having surface means and movable element means disposed against said surface means of said raceway means for movement in said raceway means, the improvement wherein said surface means of said raceway means comprises polymeric material that will be deflected by said movable element means and thereby will tend to dampen out vibrations and shock load motion as said movable element means move relative to said surface means.

4,487,596

METHOD OF, AND APPARATUS FOR, MANUFACTURING A FLIP-TOP BOX

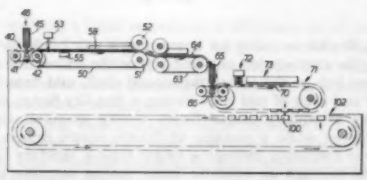
Michael G. Livens, Harlow, and James E. Adams, Billericay, both of England, assignors to Wilkinson Sword Limited, England

Filed Jan. 7, 1982, Ser. No. 337,632

Claims priority, application United Kingdom, Jan. 16, 1981, 8101398; Jun. 25, 1981, 8119630

Int. Cl.³ B31B *3/74, 7/26*

U.S. Cl. 493—125 **10 Claims**



1. A method of folding a one-piece skillet to form a flip-top

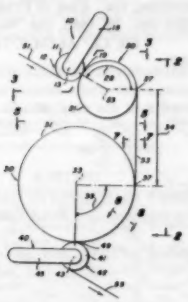
box, the skillet having crease lines to define a main panel (C_2, L_2), to form the back of the container and of the lid of the box, left and right, inside and outside panels (C_4, C^5, C_6, C_7), to form the left and right, inside and outside panels for the lid (L_6, L_4, L_7, L_5), front panel (C_1) and retainer panel (R_1) a bottom panel (C_3) for the container and a top panel (L_3)and front panel (L_1) for the lid, certain of the said panels having flaps attached thereto, which method if characterized by the steps of pressing the skillet in a first direction relative to said main panel into a rectangular opening of a first die shaped to die said main panel (C_2, L_2) to cause the adjacent said left and right inside panels (C_4, L_6, C_5, L_7) and top and bottom panels (L_3, C_3) attached thereto to be bent into planes perpendicular to said main panel (C_2, L_2) and thereafter, while the skillet is retained in the die opening, folding the front container panel (C_1) and front lid panel (L_1) into parallel relationship with the main panel (C_2, L_2) and, adhesive having been applied to the outside panels (C_6, C_7) of the container and (L_4, L_5) of the lid, pressing the partially-formed box from the first die in a second direction relative to said main panel, opposite said first direction of pressing, into a second die in which the said outside panels (C_6, C_7, L_4, L_5) are folded down and adhered in position to complete the closed box construction.

4,487,597

METHOD EMPLOYING A SPLAYED ROLL FOLDER FOR ADHESIVE APPLICATION

F. John Herrington, Holcomb, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 297,523, Aug. 28, 1981, Pat. No. 4,419,087.
This application Sep. 30, 1982, Ser. No. 429,373
Int. Cl.³ B31B *1/86, 49/04*
U.S. Cl. 493—221 **13 Claims**



1. In the manufacture of adhesive closure bags, an improved method for forming and protecting an adhesive streak therefore, comprising the following steps:

A. longitudinally depositing said streak, having a selected adhesiveness, along a selected strip and on one side of a continuously advancing sheet of indeterminate length; and

B. longitudinally pleating said strip, whereby said streak is entirely within said pleat and is adhesively attached to at least one interior surface of said pleat, by:

(1) passing said sheet under a selected tension from a striper roll to a composite roll which comprises a first cylindrical roll oriented parallel to said striper roll and a second cylindrical roll inclined with respect to and mounted adjacent an end of said first roll, said strip being approximately aligned with a circularly converging gap which is formed between a peripheral edge of said first roll and an adjacent peripheral edge of said second inclined roll, wherein adjacent circular ends of said first and second rolls are in rolling contact in the vicinity of a pinch zone at the convergence of said edges, whereby said sheet is longitudinally divided into a portion having parallel tension between said striper roll and said first roll and a portion having oblique tension between said striper roll and said second inclined roll,

(2) during said passing, transversely moving said oblique-tension portion towards said gap, and

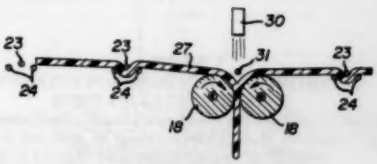
(3) forcing a strip of said oblique-tension portion into said gap to form said pleat through a peripheral wrap around distance subtended by a peripheral angle of 45°–180°.

4,487,598

BAG FOLDING APPARATUS

James A. McDonald, Palos Heights, Ill., assignor to Union Carbide Corporation, Danbury, Conn.

Continuation of Ser. No. 891,822, Mar. 30, 1978, abandoned.
This application Jul. 27, 1979, Ser. No. 61,455
Int. Cl.³ B65H *45/18*
U.S. Cl. 493—450 **4 Claims**



1. An apparatus for providing bags made from a flimsy material in an aligned configuration with a receiving means for final folding and packaging operations, comprising:

supplying means operable for supplying bags each of which has a single fold;

feeding means operatively coupled to said supplying means and operable for discharging successive single folded bags in free motion in a feed direction with the folded edge of each bag being the leading edge and with each discharged bag having a plurality of corrugated regions comprising grooves aligned in said feed direction and undulations along the transverse direction;

receiving means operable for receiving said bags from said feeding means and operable for maintaining in each of said bags at least some of said corrugated regions at least until each of said bags stops its movement along said feed direction;

wherein said receiving means comprises a plurality of upper rods and a plurality of lower rods, said rods being positioned generally along said feed direction and with respect to at least some of said corrugated regions to maintain said corrugated regions at least during the movement of each of said bags; and

a fence near said receiving means for stopping the movement of each of said bags along said feed direction.

4,487,599

METHOD AND DEVICE FOR PRODUCING INTERLOCKED STACKS OF BAGS MADE OF HOSE-LIKE THERMOPLASTIC FOIL

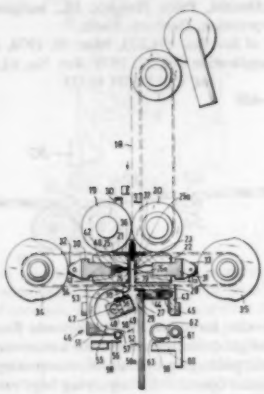
Franz Bendig, and Johannes Bendig, both of Talstrasse 72, 4018 Langenfeld, Fed. Rep. of Germany

Filed Mar. 28, 1983, Ser. No. 479,703
Claims priority, application Fed. Rep. of Germany, Mar. 26, 1982, 3211217
Int. Cl.³ B31B *23/02*
U.S. Cl. 493—194 **25 Claims**

1. A method of producing stacks of interlocked bags and the like envelopes made of a hose-like foil of thermoplastic material, comprising the steps of intermittently advancing the foil through a welding and severing station where the foil is clamped, welded along two parallel weld seams and severed along a line between the weld seams; thereafter the foil is

released in the welding station and the severed part with the still plastic weld seam is advanced a small distance in feeding direction against a stacking station where it is dashed in transverse direction against an alignment line where the still plastic weld seam is joined to the corresponding seam in the preceding bag.

4. A device for manufacturing bags and the like envelopes made of a hose-like foil of thermoplastic material, comprising means for advancing the foil in a feeding direction; a welding and severing station including a first welding device for producing a bottom weld seam in the foil, a second welding device for producing an interlocking weld seam extending parallel to



and a small distance from the bottom weld seam, and a severing device for severing a completed bag between the two weld seams; a stacking station arranged a small distance downstream of the second welding device to hold the completed bags along an aligning line; and a transfer unit arranged for seizing the trailing end portion of the severed bag, advancing the bag a small distance in feeding direction within the range of the spacing of the alignment line from the second welding device and then dashing the severed bag in transverse direction against the aligning line so that the interlocking weld seam adjoins the corresponding seam of the preceding bag held in the stacking station.

4,487,600

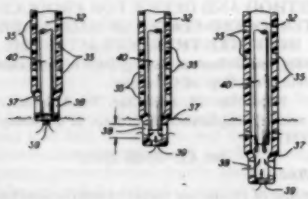
ADJUSTABLE SUCTION DEVICE FOR MEDICAL USE

Alan W. Brownlie, W. Lake Rd., Skaneateles, N.Y. 13152, and Roger D. Spier, 77 Nelson St., Auburn, N.Y. 13021

Continuation-in-part of Ser. No. 319,259, Nov. 9, 1981, abandoned. This application Aug. 10, 1983, Ser. No. 521,849

Int. Cl.³ A61M *1/00*

U.S. Cl. 604—35 **8 Claims**



1. An adjustable, disposable suction device comprising a hollow handle, an elongated substantially rigid outer tube connected at one end to the handle, the rigid tube having a plurality of longitudinally spaced radial apertures adjacent its free end, an imperforate flexible inner tube positioned in the rigid tube, there being clearance between the flexible and rigid tubes to permit the flow of fluid therebetween, the flexible tube being substantially coextensive with the rigid tube and being movable longitudinally within the latter so that it is operable to block all of the radial apertures in the rigid tube or selectively open some or all of them, a hollow slide member mounted in the handle for longitudinal movement relative thereto, the slide member being connected at one end of the flexible tube with the interiors of the tube and member being in communication with one another, coupling means at the other end of the hollow slide member for connecting its interior with a vacuum source, and means on the slide member for manually moving it back and forth and thereby move the flexible tube to open or close the radial apertures in the rigid tube, the free end of the rigid outer tube having a reduced diameter portion into which the free end of the flexible inner tube can be moved, the inner tube being received in the outer tube reduced diameter portion with a close sliding fit whereby the inner tube operates to block the radial apertures in the outer tube when its free end is positioned in the reduced diameter portion of the outer tube.

4,487,601

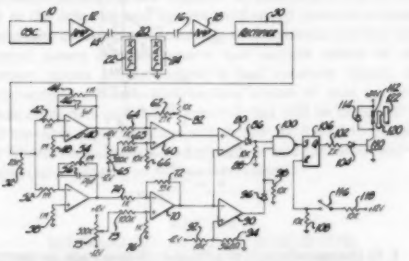
BUBBLE DETECTOR CIRCUIT WITH VARIABLE REFERENCE LEVEL

William T. Lindemann, Yardley, Pa., assignor to Extracorporeal Medical Specialties, Inc., King of Prussia, Pa.

Filed Jun. 20, 1983, Ser. No. 505,652

Int. Cl.³ A61M *5/14*

U.S. Cl. 604—122 **8 Claims**



1. Apparatus for detecting the presence of a contaminant in a fluid which passes through a passageway comprising:

means for directing energy toward said passageway, said energy being of a form which is affected by the presence or absence of said contaminants;

means for receiving energy transmitted through said passageway and responsively producing a first signal representative of the amount of said contaminant contained in said fluid;

means, responsive to said first signal, for producing a dynamic reference signal which varies relatively slowly as a function of the level of said first signal;

means, responsive to said first signal, for producing an indication signal which varies relatively quickly as a function of the level of said first signal; and

means, responsive to said dynamic reference signal and said indication signal, for producing a signal indicative of the presence of a contaminant in said fluid when said indication signal exceeds said dynamic reference signal.

4,487,602

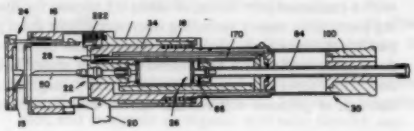
INJECTION DEVICE

Terrence B. Christensen; Allen D. McNaughton, both of Mountain View, and Steven R. Umbach, Menlo Park, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation of Ser. No. 301,661, Sep. 14, 1981, Pat. No. 4,403,989. This application Sep. 13, 1983, Ser. No. 531,871

Int. Cl.[3] A61M *5/00*

U.S. Cl. 604—137 3 Claims



1. A hand-held injection device for injecting a host animal at an injection surface thereon comprising:

a base having a forward end and rearward end;

needle-support means on said base adapted to support a needle for injection into the host animal;

a contract surface associated with the base and positioned remotely from the forward end of the base, the contact surface being adapted to contact the injection surface of the host animal to provide a means to orient the base and needle-support means with respect to the injection surface, said contact surface having a perimeter circumscribing the needle and sufficiently large to permit and facilitate orientation of the needle-support means and the injection surface of the host animal, and said contact-surface having an opening therein and being moveable relative to the needle-support means to permit a needle supported thereon to be moved through said opening into the injection surface upon urging of the base toward the injection surface; and

dose delivery means to automatically dispense a medicament dose into the host animal when said contact surface and the forward end of said base are in a preferred position relative to each other.

4,487,603

IMPLANTABLE MICROINFUSION PUMP SYSTEM

Donald L. Harris, Miami Beach, Fla., assignor to Cordis Corporation, Miami, Fla.

Filed Nov. 26, 1982, Ser. No. 444,383

Int. Cl.[3] A61M *5/00*

U.S. Cl. 604—152 18 Claims

1. A microinfusion pump system for administering a fluid to the human body at a predetermined rate, comprising:

a housing defining a pump chamber;

a piston including a permanent magnet mounted for reciprocative movement in said pump chamber in a first direction comprising a pump stroke;

valve means in said pump chamber responsive to reciprocation of said piston for urging fluid through said pump chamber, movement of said piston in one direction comprising a fill stroke for admitting fluid into said chamber, and movement of said piston in an opposite direction comprising a pump stroke for forcing fluid from said chamber;

a magnetic actuator winding in magnetic communication with said piston;

circuit means including said magnetic actuator winding for periodically actuating said magnetic winding to drive said piston along said fill stroke; and

said permanent magnet coacting with said housing to drive said piston through said pump stroke upon termination of said fill stroke to meter fluid from said pump housing.

4,487,604

APPARATUS FOR DISPENSING NUTRITIONAL SUBSTANCES ENTERICALLY

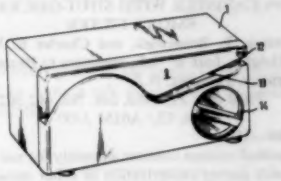
Peter Iwaschenko, Neunkirchen, and Fritz Giebler, Ostendorf, both of Fed. Rep. of Germany, assignors to Pfrimmer-Viggo GmbH & Co. KG, Erlangen, Fed. Rep. of Germany

Filed Sep. 22, 1982, Ser. No. 421,546

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1981, 3138267

Int. Cl.[3] A61M *5/00*; F04B *43/03*

U.S. Cl. 604—153 14 Claims



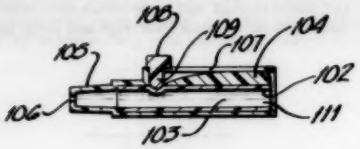
1. Apparatus for pumping and dispensing a nutrional substance enterically along a conduit comprising a support structure, an electrically driven pump on said support structure, said pump comrpising a plurality of actuators which are movable along a fixed path of travel to actuate said conduit to thereby pump said nutritional substance along said conduit, a pressing member, pivotal means pivotally mounting said pressing member on said support structure for pivotal movement between an operable position and a non-operable position, said pressing member having a generally circular section, when said pressing member is in said operable position said circular section being spaced from said path of travel of said rollers a distance less than the outer diameter of said conduit such that the part of the conduit between said circular section and said path of travel of said rollers is squeezed and collapsed to effect a pumping action along said conduit, when said pressing member is in said non-operable position said circular section being spaced from the path of travel of said rollers a distance at least as great as the outer diameter of said conduit such that said conduit can be inserted and removed from between said pressing member and said rollers, and actuating means mounted on said base support and connected to said pressing member such that operation of said operable means pivots said pressing member about said pivotal means between said operable and said non-operable position, said actuating means comprising a manually operable control member to pivot said pressing member between said operable and non-operable positions.

4,487,605

FLASHBACK DEVICE FOR CATHETERS

John McGaughey, Tampa; W. Patrick McVay, Clearwater, and William Lauer, Valrico, all of Fla., assignors to Critikon, Inc., Tampa, Fla.

Filed Nov. 17, 1982, Ser. No. 442,389
Int. Cl.³ A61M 5/00
U.S. Cl. 604—168 **6 Claims**



1. In a vascular fluid administration or withdrawal device, apparatus for indicating desired placement of said device through the mechanism of flashback comprising:

(a) an elastomeric bladder defining a chamber, open on a distal end and communicating with said device on a proximate end;

(b) an elongated cam means adjacent said bladder, tapering in thickness from said distal end to said proximate end; and

(c) actuator means, slidably movable between said proximate and said distal ends, and adapted to urge said cam means to deform said bladder, progressive distal movement of said actuator means causing respective proximate closure, distal evacuation, and distal closure of said bladder.

4,487,606

SUCTION CANISTER WITH SHUT-OFF VALVE AND SMOKE FILTER

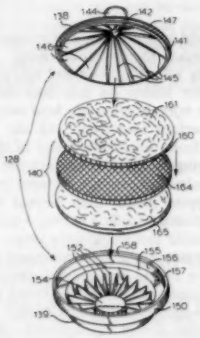
Jan L. Leviton, E. Brunswick, and Charles E. Meisch, Hasbrouck Heights, both of N.J., assignors to Becton, Dickinson and Company, Paramus, N.J.

Filed Jan. 31, 1983, Ser. No. 462,502
Int. Cl.³ A61M 1/00
U.S. Cl. 604—319 **24 Claims**

24. A medical suction canister assembly for use in aspiration of body fluids during cauterization or other smoke producing surgical procedures comprising:

an enclosed receptcle having a first opening for providing suction to said receptacle and a second opening for drawing fluids, including liquids or gases, into said receptacle during suction and a bottom wall opposed from said first opening;

unitary shut-off valve/filter means associated with the interior side of said first opening lying within a single suction path extending only from the interior of said receptacle to said first opening so that all gases are exchanged between said receptacle and said first opening through said element, said element adapted to lie substantially parallel to the free upper surface of liquid which enters said receptacle when said bottom wall rests on a substantially horizontal surface, said valve/filter means being oriented within said receptacle to be contacted by liquid in said receptacle which rises therein, said valve/filter means being porous with a maximum pore rating of about 0.5 micron for filtering particulate matter including microorganisms from gas passing therethrough, said valve/filter means capable of developing sufficiently high surface tension under liquid contact to serve as a barrier against liquid passage therethrough at pressure differentials across said valve/filter



means up to 14.7 psi, said valve/filter means adapted to terminate suction through said first opening when liquid rises in said receptacle to completely cover said element;

smoke filter means for filtering solids and liquids contained in smoke for preventing said element from terminating suction before said element is contacted by liquid in said receptacle, said smoke filter means being positioned adjacent to said valve/filter means on the side oposite the interior side of said first opening facing the interior of said receptacle; and

connection means for securing said valve/filter means and said smoke filter means together in an air-tight arrangement so that gases leaving said suction canister must pass through said smoke filter means and said valve/filter means before passing through said first opening.

4,487,607

OXIDATION HAIR DYES CONTAINING 5-HALO-2,3-PYRIDINE-DIOLS AS COUPLER COMPONENTS

David Rose, Hilden, and Norbert Maak, Neuss, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Düsseldorf-Holthausen, Fed. Rep. of Germany

Filed Apr. 23, 1982, Ser. No. 371,131

Claims priority, application Fed. Rep. of Germany, Dec. 9, 1981, 3148651

Int. Cl.³ A61K 7/13

U.S. Cl. 8—408 11 Claims

1. An oxidation dye composition for dyeing human hair comprising in substantially equal molar amounts:

(a) one or more components selected from the group consisting of 5-chloro-2,3-pyridine-diol, 5-bromo-2,3-pyridine-diol, and inorganic or organic acid salts thereof; and

(b) a developer component.

4,487,608

DYEING OF FIBROUS MATERIALS

Frederick R. W. Sloan, London, England, assignor to Lintrend Limited, London, England

PCT No. PCT/GB82/00193, § 371 Date Mar. 1, 1983, § 102(e) Date Mar. 1, 1983, PCT Pub. No. WO83/00172, PCT Pub. Date Jan. 20, 1983

Continuation-in-part of Ser. No. 354,086, Feb. 3, 1982, which is a continuation-in-part of Ser. No. 237,874, Feb. 25, 1981, abandoned. This PCT application Jul. 1, 1982, Ser. No. 474,640

Claims priority, application United Kingdom, Jul. 1, 1981, 8120333

Int. Cl.³ D06P 1/22, 1/38, 3/66, 5/00

U.S. Cl. 8—493 15 Claims

1. A process of dyeing a continuous, self-supporting fibre assembly comprising regenerated cellulose fibres which comprises the steps of

(a) cross-linking the fibers by impregnating the assembly with a polyhydroxy cross-linking agent and an activator, curing the cross-linking agent;

(b) mercerising the fibers;

(c) continuously dyeing the mercerised fibers by impregnating the assembly in one more impregnation stage with an aqueous liquor containing a vat or reactive dye and with an aqueous alkaline liquor, continuously drawing said assembly under tension from the or each impregnation stage; and

(d) fixing the dye and then washing the assembly.

4,487,609

POWDERED, STABLY DISPERSIBLE, NON-FOAMING DYE FORMULATIONS AND PROCESS FOR THEIR PREPARATION

Roland Putzar, Hofstetten, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Aug. 5, 1983, Ser. No. 520,655

Claims priority, application Switzerland, Aug. 16, 1982, 4905/82

Int. Cl.³ C09B 67/38; D06P 1/651

U.S. Cl. 8—524 9 Claims

1. A powdered, stably dispersible dye formulation which does not foam on application and comprises one or more disperse dyes and one or more anionic dispersants, which formulation additionally comprises 0.01 to 10% by weight, based on the final formulation, of a non-ionic alkoxylation product which is a reaction product of ethylene oxide and propylene oxide with a low molecular weight aliphatic polyol, said alkoxylation product having a cloud point in the range of −20° to +130° C., a molecular weight in the range of 1000 to 3000 and a propylene oxide-ethylene oxide molar ratio greater than 1.

4,487,610

COLD WATER SOLUBLE ANTHRAQUINONE DYESTUFF COMPOSITION

Dieter Mäusezahl, Biel-Benken, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 401,582, Jul. 26, 1982, abandoned. This application Aug. 5, 1983, Ser. No. 520,879

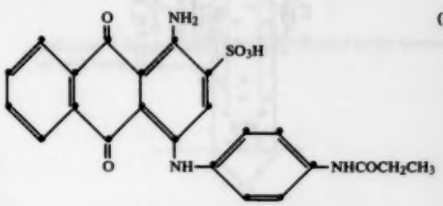
Claims priority, application Switzerland, Jun. 14, 1982, 3670/82

Int. Cl.³ C09B 67/24

U.S. Cl. 8—524 12 Claims

1. A cold water soluble dyestuff composition consisting essentially of

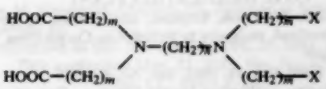
(a) 30 to 90% by weight of the dye of formula I



(I)

(b) 2 to 50% by weight of an anionic dispersant

(c) 0.1 to 10% by weight of an alkylenediaminedicarboxylic, -tricarboxylic or -tetracarboxylic acid of the formula II



(II)

wherein

X is a carboxyl group or the nitrilo group, m is 1 to 3 and n is 2 to 5, or a salt thereof, and optionally further ingredients.

4,487,611

GAS COOLER FOR A SYNTHETIC GAS

Georg Ziegler, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Sep. 22, 1982, Ser. No. 421,304

Claims priority, application Switzerland, Oct. 23, 1981, 6785/81

Int. Cl.³ C10J 3/84

U.S. Cl. 48—69 11 Claims

8. A gas cooler for a synthesis gas, said cooler comprising

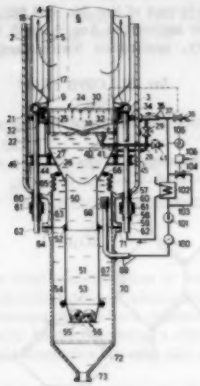
a downcomer for receiving and cooling a downward flow of synthesis gas, said downcomer having outlets near a lower end for an outflow of the cooled synthesis gas;

first means for defining a waterbath below said downcomer having a depth several times a horizontal extent thereof, said first means including a vessel below said downcomer for receiving a flow of water, a narrowing at a lower end of said vessel, an insert extending downwardly from said narrowing and a casing spaced about said insert to define an annular chamber therebetween to receive a flow of water;

second means for circulating a flow of water through said first means in a downward direction, said second means including at least one outlet for introducing a return flow of the water into an upper end of the waterbath; and

third means for controlling the temprature of the return flow

of the water to the waterbath whereby the temperature is maintained at a value between the dew point of the synthesis gas and the evaporation point of the water at the working pressure of the synthesis gas.



4,487,612

COAL GASIFICATION PLANT

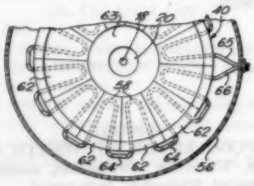
Dennis Hebden, Wareham, England, and Charles T. Brooks, Kinross, Scotland, assignors to British Gas Corporation, London, England

Filed Aug. 19, 1982, Ser. No. 409,534

Claims priority, application United Kingdom, Oct. 27, 1981, 8132336

Int. Cl.³ B01J *3/00*; C10J *3/48*

U.S. Cl. 48—77 **9 Claims**



1. A slagging gasifier comprising:

a gasifying vessel;

means for introducing coal or other carbonaceous fuel into the vessel for gasification thereof;

means for introducing a gasifying medium into the vessel to effect gasification of the fuel therein;

a hearth including a liquid cooled slag tap member located centrally at the bottom of the hearth and having a slag removal orifice for removing molten slag from the vessel;

the improvement wherein the remaining area of the hearth surmounting said slag tap is provided with an annular structure formed from a plurality of separate annular sector-shaped cast parts made of high thermal conductivity metal which are secured together in situ so as to fit above and around said slag tap member;

said structure having means defining at least one integrally formed passageway for circulating a coolant liquid through said structure; and

said structure also having an upper tundish surface with a slope of at least 10° to the horizontal across which tundish surface the molten slag flows downwardly and inwardly towards the slag tap member.

4,487,613

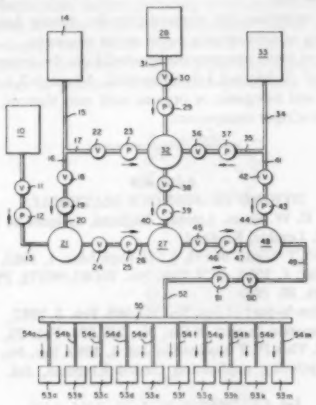
ODORIZATION OF COMBUSTIBLE HYDROCARBON GASES

Takao Yoshida; Ira Katz, both of West Long Branch; Craig B. Warren, Rumson, and Charles Wiener, Middletown, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Sep. 26, 1983, Ser. No. 536,121

Int. Cl.³ C10J *1/28*

U.S. Cl. 48—197 FM **11 Claims**



1. A warning agent suitable for the odorization of gaseous hydrocarbon fuel, said agent selected from the group consisting of (i) 4-methyl-4-mercapto-2-pentanone, (ii) 2-methoxy-3-isobutyl pyrazine and (iii), mixtures of same in addition, a gas odorant selected from the group consisting of monomercaptans, acyclic and cyclic sulfides and mixtures of same.

7. A process for the odorization of a hydrocarbon fuel gas which comprises incorporating in said gas an effective odorizing quantity of a warning mixture (i) a substance selected from the group consisting of 4-methyl-4-mercapto-2-pentanone, 2-methoxy-3-isobutyl pyrazine and mixtures of same and (ii) a gas odorant selected from the group consisting of monomercaptans, acyclic sulfides, cyclic sulfides and mixtures of same.

4,487,614

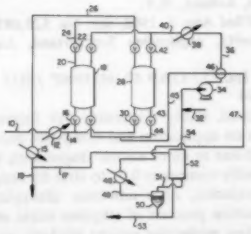
ADSORPTION SEPARATION CYCLE

Carmen M. Yon, Carmel, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Nov. 16, 1983, Ser. No. 552,337

Int. Cl.³ B01D *53/04*

U.S. Cl. 55—33 **11 Claims**



1. In an adsorption separation process which comprises:

(a) passing in the vapor phase a feedstock comprising at least 2.5 weight percent water in admixture with at least one

organic molecular species into a fixed adsorption bed at a temperature and pressure which prevents the capillary condensation of said organic molecular species, said fixed adsorption bed containing an adsorbent mass consisting essentially of a crystalline zeolitic molecular sieve adsorbent having pores small enough to substantially exclude the said organic molecular species, moving the water adsorption mass transfer front and the coinciding or trailing heat front created in said fixed bed along said bed toward the effluent end thereof to a predetermined point short of breakthrough of either of said front, at least that portion of said molecular sieve adsorbent contacted by said water mass transfer front containing adsorbed thereon prior to and at the time of contact of said front, at least about 2, and preferably at least about 5, weight percent water, said molecular sieve adsorbent having a capacity for the adsorption of water under the imposed operating conditions greater than the water loading thereon at the time of contact by the water mass-transfer front;

(b) from the effluent end of said bed, recovering a product stream containing a lower concentration of water than the feedstock;

(c) terminating the flow of feedstock into said bed prior to breakthrough of either of the heat front and the water mass transfer front, and prior to substantial loss of the heat energy from the bed, commencing the counter-current passage through said bed of an essentially non-sorbable purge gas at a temperature within about 25° F. of the temperature of, and substantially at the same pressure as, the feedstock entering the bed during adsorption step (a), said temperature and pressure being sufficient to prevent capillary condensation of the said organic molecular species of said feedstock, whereby the energy of the said heat front is utilized in desorbing water from the adsorbent mass;

(d) continuing the counter-current purging of said bed until the water loading on said adsorbate is essentially the same as at the beginning of adsorption step (a); and

(e) repeating adsorption step (a), the improvement which comprises carrying out the counter-current passage of non-sorbable purge gas through the bed in steps (c) and (d) by recycling the said purge gas effluent from said bed through cooling means to lower its temperature below the water dew point thereof whereby liquid water is formed, and intimately contacting the effluent purge gas phase from said cooling means with a liquid phase portion of the product recovered in step (b) to further reduce the water content of said purge gas, separating at least a portion of the said water-enriched liquid phase product from the purge gas and passing the resulting purge gas through the bed.

4,487,615

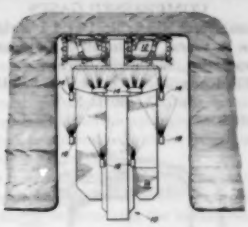
METHOD OF REDUCING MINE DUST

Larry D. Taylor, Morgantown; David M. Miller, Metz, and Pramod C. Thakur, Morgantown, all of W. Va., assignors to Conoco Inc., Ponca City, Okla.

Filed Jun. 13, 1983, Ser. No. 504,031
Int. Cl.³ B01D *47/00*; C09K *3/22*
U.S. Cl. 55—84 **1 Claim**

1. In a method of collecting airborne respirable dust particles from working areas of coal mines by spraying said dust particles with water from a spray nozzle, the improvement comprising:

adding to said water, prior to passing said water at a pressure of from 10 to 40 MPa through said spray nozzle, a surfactant having the formula $CH_3(CH_2)_xCH_2(OCH_2CH_2)_nOH$ where x ranges from 4 to 16 and n ranges from about 3 to 11, said surfactant being added in an amount of from 0.01 to 0.5 volume percent, said amount of surfactant being sufficient to enhance the electrical charge of spray from said nozzle, thereby reducing the amount of stage 4 and stage 5 dust particles substantially more than said stage 4



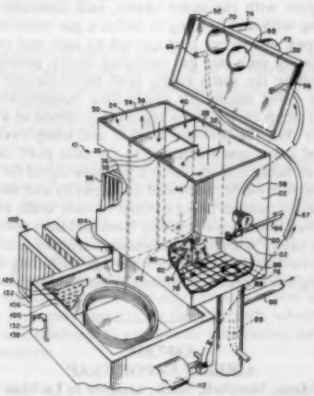
and stage 5 dust particles would be reduced in the absence of said surfactant.

4,487,616

METHOD FOR REMOVING SOLVENT FROM SOLVENT VAPOR-LADEN AIR EXITING A DRY-CLEANING MACHINE

Bruce M. Grossman, Chicago, Ill., assignor to Scrub-Tek, Inc., Chicago, Ill.

Continuation of Ser. No. 314,791, Oct. 26, 1981, abandoned. This application Mar. 21, 1983, Ser. No. 476,971
Int. Cl.³ B01D *47/00*
U.S. Cl. 55—85 **7 Claims**



1. A method for recovering hydrocarbon and hydrocarbon derived solvents from solvent laden air including the steps of:

moving the solvent laden air through a first chamber,

moving a film of liquid coolant, which liquid coolant is cooled to a temperature at least as low as 20° F. and is immiscible with the solvent to be recovered, over plates located in the first chamber in contact with the solvent laden air, thereby condensing the solvent on the film of liquid coolant moving over the plates,

collecting the immiscible liquid coolant and condensed solvent, and:

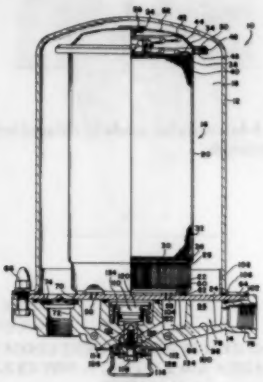
separating the immiscible liquid coolant from the condensed solvent.

4,487,617

MECHANISM FOR CLEANING AND DRYING COMPRESSED GASES

Larry E. Dienes, North Ridgeville; David J. Knight, Avon Lake, and William R. Wurst, Lorain, all of Ohio, assignors to The Bendix Corporation, Southfield, Mich.

Filed Aug. 22, 1983, Ser. No. 525,186
Int. Cl.³ B01D *53/04*
U.S. Cl. 55—163 **12 Claims**



1. Mechanism for cleaning and drying compressed gasses comprising an open ended housing, a desiccant canister in said housing, and an end cover closing the open end of said housing, said end cover defining a sump cavity therewithin, an inlet port carried by said end cover and communicated with a source of compressed gas, a circuitous passage communicating the inlet port with the sump cavity, said desiccant canister cooperating with said housing to define a gas receiving cavity therebetween, a delivery port carried by said end cover and communicating with said gas receiving cavity, passage means communicating the sump cavity with the desiccant canister, and dump valve means for controlling communication between said sump cavity and a region maintained at a pressure level lower than the pressure level in said sump cavity when compressed gas is communicated to the inlet port, said dump valve means being responsive to a pressure signal for controlling communication between said sump cavity and said region, said circuitous passage being defined by side walls and a bottom wall, said bottom wall canting from said inlet port towards said pump cavity whereby contaminants tend to drain toward said sump cavity, said circuitous passage including segments overlapping one another connected by bends at the ends of said segments.

4,487,618

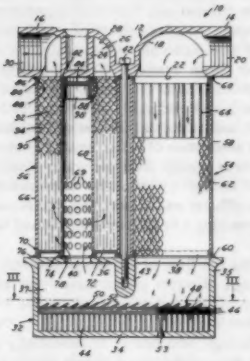
AIRLINE VAPOR TRAP

David O. Mann, Marshall, Mich., assignor to La-Man Corporation, Hamilton, Ind.

Filed Aug. 19, 1982, Ser. No. 409,539
Int. Cl.³ B01D *50/00*
U.S. Cl. 55—323 **16 Claims**

1. An in-line trap for removing vapor from a compressed airline or the like comprising a manifold including spaced means defining an inlet and an outlet, and means between said spaced means for directing incoming air downwardly from said inlet and receiving air directed upwardly toward said outlet, enclosure means defining an enclosed volume suspended beneath and spaced from said manifold, first means mounted and extending between said inlet and said enclosure means for directing incoming air downwardly into said enclosed volume, said first means including means adapted to promote coalescence of vapor in air passing therethrough into droplets, second means mounted and extending between said enclosure means and said outlet for directing air from said enclosed volume to said outlet, and

means disposed within said enclosed volume to capture vapor droplets in air entering said enclosed volume, said capture means comprising a porous structure positioned to occupy a lower portion of said enclosed volume and having passages for admitting water droplets, said passages cooperating with said enclosure means and with each other for substantially preventing air flow through said porous structure so as to define a zone of substantially zero air movement, cross-sectional dimension to air flow in said enclosure means being substantially greater than within said first means, such that air velocity is reduced within said enclosure means and vapor droplets fall by gravity and centrifugal force toward said zone.

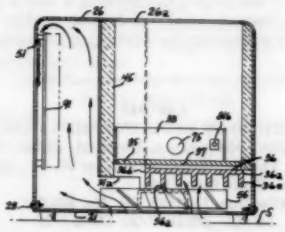


4,487,619

THERMOELECTRIC TEMPERATURE CONTROLLER FOR LIQUID CHEMICAL BUBBLER CONTAINERS

David E. Jones, Pecatonica, Ill., assignor to Apache Chemicals, Inc., Seward, Ill.

Filed Mar. 23, 1984, Ser. No. 592,836
Int. Cl.³ F25B *21/02*
U.S. Cl. 62—3 **7 Claims**



1. A thermoelectric temperature controller for a liquid chemical bubbler container of the type having a bottom wall, a generally cylindrical side wall and bubbler gas inlet and outlet fittings in the top wall, the controller comprising, a housing of generally rectangular configuration having a bottom wall, front and rear walls, first and second end walls, and a top wall, an upright partition extending between the front and rear walls and separating the housing into a container receiving compartment between the partition and said first side wall and an electrical circuit component compartment between the partition and said second side wall, the housing

having an opening in the top wall above the container receiving compartment to allow the inlet and outlet fittings to extend therethrough, a thermally conductive plate spaced above the bottom wall and disposed at the lower end of the container receiving compartment for supporting the bubbler container in thermally conductive contact therewith, at least one thermoelectric device engaging the underside of the thermally conductive plate, a thermally conductive heat sink engaging the underside of the thermoelectric device and having relatively parallel heat conducting fins at its underside extending perpendicular to the front and rear walls, means including said heat conductive plate and said heat sink defining a fan compartment in the housing below the container receiving compartment and above the bottom wall of the housing, the bottom wall of the housing having air inlet openings therethrough communicating with the fan compartment, the front and rear walls of the housing respectively having front and rear fan compartment air discharge openings therein at a level below the thermally conductive plate and adjacent opposite ends of the fins on the heat sink, the housing having at least one component compartment air discharge opening adjacent the upper end of the circuit component compartment, the partition having a lower opening therethrough below the thermally conductive plate and communicating said fan compartment with the lower end of said circuit component compartment, a propeller fan mounted in the fan compartment for rotation about an upright blade axis and having a major portion of its blade area closely underlying the fins on the heat sink and another portion of its blade area extending beyond the fins on the heat sink in a direction toward the circuit component compartment, the fan being arranged to draw air in from the air inlet openings in the bottom wall of the housing and discharge one portion of the output air upwardly against the heat sink for flow between the fins and under the heat sink to the front and rear fan compartment air discharge opening and discharge another portion of its output air through the lower opening in the partition into the circuit component compartment for flow through the component compartment air discharge outlet, temperature sensing means for sensing the temperature of the liquid in the container, and circuit means in said circuit components compartment and connected to said temperature sensing means and to said thermoelectric device for regulating operation of the thermoelectric device to establish and maintain a predetermined temperature in the liquid in the container.

4,487,620

METHOD AND APPARATUS FOR MANUFACTURING ROUNDED VITREOUS BEADS

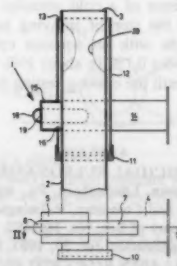
Hubert Neusy, Montignies-sur-Sambre, Belgium, assignor to Glaverbel, Brussels, Belgium

Filed Jun. 8, 1983, Ser. No. 501,907

Claims priority, application United Kingdom, Jun. 8, 1982, 8216648

Int. Cl.³ C03B *19/10*

U.S. Cl. 65—21.3 **29 Claims**



1. A method of forming rounded vitreous beads in which particles of bead forming material entrained in a combustible gas mixture having comburent and combustible components are projected from a burner head as the gas is burned, comprising the steps of:

entraining the particles in a first component of the combustible gas mixture;

propelling the first component with entrained particles along a passageway leading to the burner head;

forcing a second gas component of the combustible gas mixture transversely into the passageway through at least one orifice in a peripheral wall of the passageway to form the combustible gas mixture; and

subjecting the combustible gas mixture in which the particles are entrained to forces further promoting intimate mixing thereof before reaching the burner head.

4,487,621

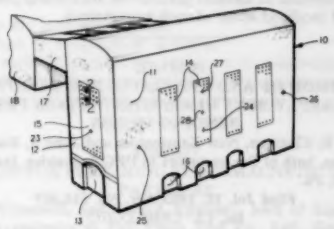
METHOD OF SEALING GLASS FURNACES TO PREVENT AIR LEAKAGE

Ray S. Richards, Sylvania, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Sep. 26, 1983, Ser. No. 535,514

Int. Cl.³ C03B *5/42*

U.S. Cl. 65—27 **10 Claims**



1. The method of sealing the refractory walls of a furnace heat exchanger against the movement of air through the brick works, comprising the step of applying a coating of a flexible, rubber-like material to the external surfaces of the wall portions of the furnace across which air leakage into and out of the furnace occurs.

10. A regenerative glass melting furnace having air preheating regenerators for receiving heated exhaust gases during one cycle of the furnace operation and combustion air during the reverse cycle of furnace operation with cleanout panels located in the walls of the regenerators and opening out to the exterior thereof, the improvement in such furnaces comprising a coating of high temperature, water based silicone elastomer over the external surface of the regenerators to seal the cleanout panels from movement of air therethrough, which coating is of sufficient thickness to prevent air permeating the walls of the regenerators.

4,487,622

METHOD AND APPARATUS FOR FORMING FIBER WEBS

Jean A. Battigelli, Rantigny, and Guy Berthier, Clermont, both of France, assignors to Isover Saint-Gobain, Paris la Défense, France

Filed Dec. 27, 1982, Ser. No. 453,733

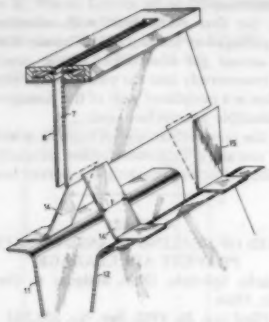
Claims priority, application France, Dec. 28, 1981, 81 24318

Int. Cl.³ C03B *37/06*

U.S. Cl. 65—4.4 **7 Claims**

5. A method for making a fiber web from fibers which are attenuated from molten meterial, comprising developing a multiplicity of streams of the molten material, subjecting the streams to attenuation by delivering the streams into an attenuating gas flow directed toward a conveyor having a perforate surface for receiving and accumulating the attenuated fibers in

the form of a web, entraining ambient gas into the attenuating gas flow in a region intermediate the attenuation of the fibers and the accumulation of the attenuated fibers on the perforate surface of the conveyor, spreading the combined attenuating



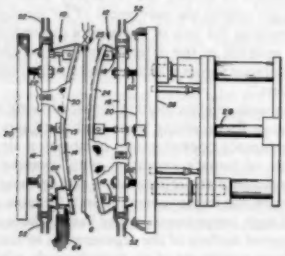
and entrained flow over the width of the perforate surface of the conveyor, and regulating the uniformity of distribution of the fibers over the width of the conveyor by locally regulating the entrainment of ambient gas into the attenuating gas flow in selected localized zones of such entrainment.

4,487,623

METHOD OF AND APPARATUS FOR REMOVING SHARPLY BENT GLASS SHEETS FROM PRESS BENDING MOLDS

George R. Claassen, New Kensington, and John J. Ewing, Tarentum, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jul. 18, 1983, Ser. No. 514,393
Int. Cl.³ C03B *23/035*
U.S. Cl. 65—106 **12 Claims**



1. A method of press bending a glass sheet to a curved shape comprising heating said glass sheet to an elevated temperature sufficient for deformation, sandwiching said glass sheet while the latter is supported in a vertical or oblique orientation in pressurized engagement between a pair of press bending molds of complementary convex and concave curvature when said glass sheet is at its deformation temperature to deform said glass sheet to a conforming shape and separating said molds from one another when said deforming is completed, whereby said shaped glass sheet tends to remain in hugging relation to a convexly shaped portion of said separating mold of convex curvature during said separation, characterized by applying vacuum through at least a portion of said mold of concave curvature that faces said convexly shaped portion when said molds separate to apply suction to the major surface of convex curvature of the deformed glass sheet to maintain the deformed glass sheet in said vertical or near vertical orientation as said molds separate.

11. Apparatus for press bending a glass sheet comprising a pair of press bending molds of complementary convex and concave curvature, means to provide relative motion between said molds between a separated position and a glass sheet-engaging position, means to deliver a glass sheet heated to its deformation temperature into a shaping position between said press bending molds when the latter are separated, wherein said means to provide relative motion moves said molds toward one another to engage said glass sheet at deformation temperature to impress their complementary shapes thereon and then to retract, said press bent glass sheet tending to hug said mold of convex curvature during said separation, characterized by aperture means in said concave pressing mold, means for applying vacuum through said aperture means of the concave press bending mold to prevent said glass sheet from sticking to said convex press bending mold when said molds separate from one another after having deformed said glass sheet to its desired shape.

4,487,624

FERTILIZERS PELLETIZED WITH HYDRATED SULFATES

Jean M. Lalancette, and Claude Ostiguy, both of Sherbrooke, Canada, assignors to Societe Nationale de L'Amiante, Quebec, Canada

Continuation of Ser. No. 377,176, May 11, 1982, abandoned. This application Nov. 21, 1983, Ser. No. 554,161
Int. Cl.³ C05D *5/00*
U.S. Cl. 71—32 **8 Claims**

1. A compressed fertilizer unit for dispensing sulfur and magnesium and at least one of the essential elements selected from nitrogen, potassium and phosphorus, said unit being characterized by the absence of binding agent, comprising a compressed homogeneous mixture of

(a) a hydrated magnesium sulfate containing at least four moles of water of hydration, and

(b) at least one fertilizer compound capable of releasing at least one of the essential elements selected from nitrogen, potassium and phosphorus, the ratio of (a) to (b) being from 1:1 to 5:1, and wherein the final product has a water content of from 29.97% to 48.24%, a Rockwell hardness of from 4.6 to 6.6 and a compression resistance of from 20.72 to 72.0 Kg/cm^2.

4,487,625

METHOD FOR INTERRUPTING BUD DORMANCY

Georg L. Rieder, Grobenzell, Fed. Rep. of Germany, assignor to SKW Trostberg, Fed. Rep. of Germany

Filed Dec. 6, 1982, Ser. No. 447,441
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1981, 3150404
Int. Cl.³ A01N *59/24*
U.S. Cl. 71—77 **9 Claims**

1. Method for interrupting the bud dormancy of perennial crop-bearing plants after the plants bear fruit and cease growing and in the absence of a cold stimulus to interrupt dormancy, comprising the step of spraying such plants having existing resting buds with an aqueous cyanamide solution comprising from about 0.1% to about 10% by weight of dissolved cyanamide until the existing resting buds are wetted by said solution.

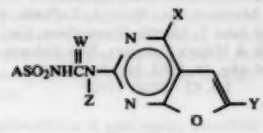
4,487,626

HERBICIDAL SULFONAMIDES

William T. Zimmerman, Landenberg, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

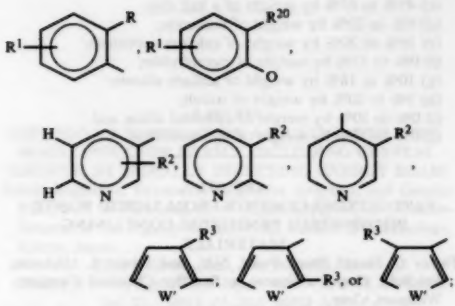
Continuation-in-part of Ser. No. 180,482, Aug. 22, 1980, abandoned. This application Jul. 27, 1981, Ser. No. 286,159
Int. Cl.³ A01N *9/14*; C07D *491/048*
U.S. Cl. 71—90 **40 Claims**

1. A compound selected from



I

where A is



R is H, C_1–C_4 alkyl, C_2–C_4 alkenyl, C_5–C_6 cycloalkenyl, phenyl, phenyl substituted with one Cl or CH_3 group, C_1–C_4 alkoxy, F, Cl, Br, NO_2, NH_2, CN, CF_3, $C(O)R^4$, $S(O)_mR^5$, $SO_2NR^6R^7$, $SO_2N(OCH_3)CH_3$, $SO_2OCH_2CF_3$, $SO_2OCH_2CCl_3$, BR^8, OSO_2R^9, CH_2L or $CH(CH_3)L$;

Z is H or CH_3;

R^1 is H, F, Cl, Br, CF_3, C_1–C_4 alkyl, C_1–C_4 alkoxy or NO_2;

R^4 is H, C_1–C_3alkyl, C_1–C_6 alkoxy, benzyloxy, C_3–C_6 alkenyloxy, C_3–C_6 alkynyloxy, C_2–C_6 haloalkoxy substituted with 1–3 atoms selected from F, Cl or Br, C_5–C_6 cycloalkoxy, $O(CH_2CH_2O)_nR^{10}$, $OCH_2CH_2CH_2OR^{10}$, OCH_2OR^5, $OCH_2OCH_2CH_2OR^{10}$, $NR^{11}R^{12}$ or C_1–C_4 alkylthio;

m is 0, 1 or 2;

n is 1 or 2;

R^5 is C_1–C_4 alkyl;

R^6 and R^7 are independently C_1–C_4 alkyl, provided that the total number of carbon atoms of R^6 and R^7 is less than or equal to 5;

B is O or $S(O)_m$;

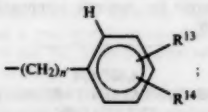
R^8 is CHF_2, CF_3, CH_2CF_3 or CF_2CHFG where G is F, Cl, Br or CF_3;

R^9 is C_1–C_4 alkyl, $CH_2CH_2OCH_3$, $CH_2CH_2CH_2OCH_3$, or C_1–C_4 alkyl substituted with 1–3 atoms of F, Cl or Br;

L is Cl, Br, C_1–C_4 alkoxy, C_3–C_4 alkenyloxy, OH, $S(O)_mR^5$, CO_2R^{17} or $SO_2N(CH_3)_2$;

R^{10} is CH_3 or C_2H_5;

R^{11} is H, C_1–C_4 alkyl, OCH_3 or



R^{12} is H or C_1–C_4 alkyl;

R^{11} and R^{12} can also be taken together to form $—(CH_2)_4—$, $—(CH_2)_5—$ or $—CH_2CH_2OCH_2CH_2—$;

n' is 0 or 1;

R^{13} is H, F, Cl, Br, NO_2, CN, CF_3, C_1–C_3 alkyl, OCH_3 or SCH_3;

R^{14} is H, F, Cl, Br, CH_3 or OCH_3;

R^2 is H, F, Cl, Br, C_1–C_4 alkyl, C_1–C_4 alkoxy, NO_2, CO_2R^{15}, $S(O)_mR^{16}$, $SO_2NR^{18}R^{19}$ or $SO_2N(OCH_3)CH_3$;

R^{15} is C_1–C_4 alkyl;

R^{16} is C_1–C_3 alkyl;

R^{17} is C_1–C_4 alkyl, C_3–C_4 alkenyloxy, $CH_2CH_2OCH_3$ or CH_2CH_2Cl;

R^{18} and R^{19} are independently CH_3 or C_2H_5;

W' is O or S;

R^3 is C_1–C_4 alkyl, C_1–C_4 alkoxy, H, F, Cl, Br, NO_2, $SO_2MR^6R^7$, $SO_2N(OCH_3)CH_3$ or $C(O)R^4$;

R^{20} is F, Cl, Br, CO_2R^{17}, OSO_2R^9, NO_2, C_1–C_4 alkyl or C_1–C_4 alkoxy;

W is O or S;

X is CH_3, C_2H_5, Cl, OCH_3, OC_2H_5, $N(CH_3)_2$ or SCH_3; and

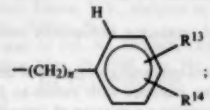
Y is H, CH_3 or C_2H_5;

and their agriculturally suitable salts; provided that

(a) when R^{11} is OCH_3; then R^{12} is CH_3;

(b) if R^1 is other than H and R is H, then R^1 cannot be in the 4-position of the benzene ring;

(c) when R^{11} is



then R^{12} is H or CH_3; and

(d) when W' is O, then R^3 is CO_2R^{17}.

33. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim 1.

4,487,627

METHOD FOR PREPARING FERROMAGNETIC METAL PARTICLES

Shizuo Umemura, and Tatsuji Kitamoto, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 1, 1983, Ser. No. 547,618

Claims priority, application Japan, Nov. 1, 1982, 57-192099

Int. Cl.³ B22F 9/22

U.S. Cl. 75—0.5 BA **10 Claims**

1. A method for preparing ferromagnetic metal particles, comprising the steps of:

dehydrating oxyhydroxide particles comprised mainly of iron in a non-reducing gas under heating at a temperature of 500° C. or less to form oxide particles;

providing silicon compounds on the surface of the oxide particles; and then

reducing the oxide particles in a reducing gas under heating.

4,487,628

SELECTIVE REDUCTION OF HEAVY METALS

Gotthard Björling, Djursholm, Sweden, assignor to SKF Steel Engineering Aktiebolag, Hofors, Sweden

Continuation of Ser. No. 324,696, Nov. 25, 1981,. This application Sep. 14, 1983, Ser. No. 532,181

Claims priority, application Sweden, Mar. 10, 1981, 8101495

Int. Cl.³ C22B 4/00

U.S. Cl. 75—10 R **9 Claims**

1. A method of selectively reducing heavy metals out of finely grained, substantially oxidic material, comprising the steps of blowing oxidic material containing the oxides of at least two metals selected from the group consisting of Fe, Cu, Zn, Pb, Ni, Cr and V into a shaft filled with coke together with an amount of reducing agent required for obtaining a desired selectivity, simultaneously supplying heat energy by a gas heated in a plasma generator, adjusting the effective oxygen potential to that at which the desired metal oxides are tranformed into a particular, isolatable phase as metal melt, metal vapor, speiss or matte and at which the remaining metal oxide enters into a slag phase and may be isolated as slag melt by

regulating the ratio between the amount of said reducing agent and said oxidic material and further by regulating the amount of heat energy supplied, and thereby selectively reducing at least one metal in such a manner that said coke does not substantially participate in the reduction reaction, and simultaneously not substantially reducing at least one of said oxides said at least one of said oxides not reduced including substantially all of the oxides of chromium and vanadium oxide, if any, present in the oxidic material.

4,487,629

ZIRCONIUM ISOTOPE SEPARATION

Mark B. Siddall, Albany, Oreg., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Sep. 19, 1979, Ser. No. 77,144
Int. Cl.³ B01D *59/10, 59/00*
U.S. Cl. 75—84.4 **7 Claims**

1. A method of producing isotopically tailored zirconium comprising

reacting zirconium containing a mixture of desired and undesired zirconium isotopes with iodine to form zirconium tetraiodide containing a mixture of desired and undesired zirconium isotopes,

separating the zirconium tetraiodide into a first fraction containing the undesired zirconium isotopes and a second fraction containing the desired zirconium isotopes,

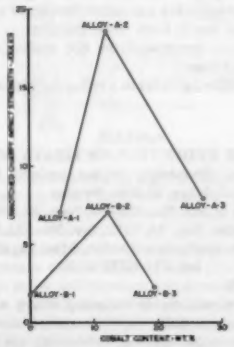
and subsequently reducing the second fraction in an iodide crystal bar cell to produce zirconium metal containing the desired zirconium isotopes.

4,487,630

WEAR-RESISTANT STAINLESS STEEL

Paul Crook, Kokomo, and Richard D. Zordan, Indianapolis, both of Ind., assignors to Cabot Corporation, Kokomo, Ind.

Filed Oct. 25, 1982, Ser. No. 436,233
Int. Cl.³ C22C *33/00*
U.S. Cl. 75—123 B **8 Claims**



1. An alloy consisting essentially of, in weight percent, 10 to 40 chromium, 5 to 15 nickel, 20 maximum nickel plus manganese, 3 to 7 silicon, 0.25 to 3.5 carbon plus boron, 0.2 maximum nitrogen, 10 to 40 one or more of molybdenum, tungsten, vanadium, tantalum, columbium, titanium, chromium, zirconium, and hafnium, 5 to 30 cobalt and the balance iron plus impurities.

4,487,631

SHOT-FREE MILLBOARD

James M. Britt, Martinez, Ga.; Steve A. LaPrade, North Augusta, S.C., and John T. Martin, Waynesboro, Ga., assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Aug. 11, 1983, Ser. No. 522,436
Int. Cl.³ C04B *19/04*
U.S. Cl. 106—80 **2 Claims**

1. A shot-free millboard comprising in combination:
(a) 5% to 25% by weight of a glass fiber;
(b) 3% to 5% by weight of an organic fiber;
(c) 45% to 65% by weight of a ball clay;
(d) 0% to 20% by weight of bentonite;
(e) 10% to 20% by weight of calcium carbonate;
(f) 0% to 15% by weight of pyrophyllite;
(g) 10% to 18% by weight of sodium silicate;
(h) 5% to 10% by weight of starch;
(i) 0% to 10% by weight of colloidal silica; and
(j) 0% to 15% by weight of hydrated lime.

4,487,632

FAST-SETTING CEMENTS FROM LIQUID WASTE PHOSPHORUS PENTOXIDE CONTAINING MATERIALS

Fawzy G. Sherif, Stony Point, N.Y., and Edwin S. Michaels, Fairfield, Conn., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Aug. 11, 1983, Ser. No. 522,133
Int. Cl.³ C04B *9/04*
U.S. Cl. 106—85 **31 Claims**

1. A mixture capable of forming a fast-setting cement comprising:
(a) a liquid phosphorus pentoxide containing waste component; and
(b) a solid component comprising at least one magnesium containing compound, said solid component capable of reacting with said liquid waste to form a monolithic solid.

4,487,633

WATER-INSEPARABLE CONCRETE COMPOSITION

Masaharu Sakuta, Tokyo; Soichi Kiya, Hachioji; Iwao Uchizaki, Tokyo; Yasuhiko Yoshioka, Mitaka; Koichi Ito, Tokyo; Toshio Saito, Kashiwa; Tadahiro Kaya, Kanagawa; Tsunetoshi Shioya, and Yoshifumi Shimoyama, both of Fujisawa, all of Japan, assignors to Takenaka Komuten Co., Ltd., Osaka; Takenaka Doboku Co., Ltd. and Sankyo Chemical Industries Ltd., both of Tokyo, all of, Japan

Filed Jun. 24, 1983, Ser. No. 507,544
Claims priority, application Japan, Sep. 22, 1982, 57-163900
Int. Cl.³ C04B *7/35*
U.S. Cl. 106—90 **6 Claims**

1. A water-inseparable concrete composition, comprising a cement component, an aggregate, and a polyacrylamide partial hydrolysate having a molecular weight of not lower than one million and a hydrolysis degree of 0.5 to 20 mole percent, wherein the polyacrylamide is contained in an amount ranging from 0.5 to 4 percent by weight of a constitutent portion of the cement, and wherein the concrete composition is for use in laying underwater.

4,487,634

SUSPENSIONS CONTAINING MICROFIBRILLATED CELLULOSE

Albin F. Turbak, Convent Station; Fred W. Snyder, Wharton, both of N.J., and Karen R. Sandberg, Shelton, Wash., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Division of Ser. No. 202,740, Oct. 31, 1980, Pat. No. 4,378,381.
This application Nov. 15, 1982, Ser. No. 441,684
Int. Cl.³ C08L *1/00*
U.S. Cl. 106—203 **2 Claims**

1. A paint composition comprising a suspension of a finely

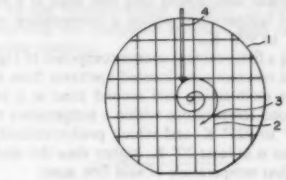
divided paint pigment in a paint vehicle, said paint vehicle being a liquid suspending medium which swells cellulose, said paint composition containing microfibrillated cellulose in an amount sufficient to produce a stable, homogeneous suspension, said microfibrillated cellulose having been prepared by repeated passage of fibrous cellulose through a high pressure homogenizer.

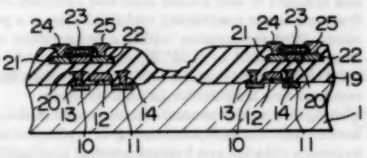
4,487,635

METHOD OF FABRICATING A MULTI-LAYER TYPE SEMICONDUCTOR DEVICE INCLUDING CRYSTAL GROWTH BY SPIRALLY DIRECTING ENERGY BEAM

Koichi Kugimiya, Toyonaka; Shigenobu Akiyama, and Genshu Fuse, both of Hirakata, all of Japan, assignors to Director-General of the Agency of Industrial Science & Technology, Tokyo, Japan

Filed Feb. 14, 1983, Ser. No. 466,301
Claims priority, application Japan, Mar. 25, 1982, 57-46288
Int. Cl.³ H01L *21/263*; B05D *3/06*
U.S. Cl. 148—1.5 **10 Claims**





1. A method of fabricating a multilayer-type semiconductor device comprising the steps of:

forming a first-layer semiconductor element on the surface of a semiconductor substrate;

forming at least one rectangular opening in an insulating film located on a scribe line of said semiconductor substrate to expose said semiconductor substrate through said opening, depositing a polycrystal semiconductor film on said insulating film and the semiconductor substrate exposed through said opening;

irradiating an energy beam on said polycrystal semiconductor film spirally relative to said semiconductor substrate, in such a manner that said beam passes said at least one opening during one revolution, thereby to crystallize said polycrystal semiconductor film, the diameter of the irradiated energy beam being larger than the maximum length of the opening, the semiconductor substrate exposed through said opening serving to provide a seed crystal for crystallization of said polycrystal semiconductor film; and

forming a second-layer semiconductor element on said crystallized layer.

4,487,636

COLOR CODING OF POWDER METAL PARTS

Richard A. Bernard, Norwalk; Anthony A. Alusik, Stratford, and Bettadapur S. Ananthamurthy, Norwalk, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Nov. 17, 1982, Ser. No. 442,332
Int. Cl.³ C23F *5/04*; B05D *1/36, 7/00*
U.S. Cl. 148—6.1 **24 Claims**

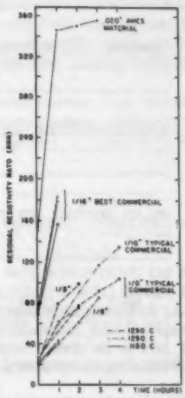
1. A process for color coating of a sintered powder metal part which comprises contacting said metal part with a color formulation comprising: from about 1 to 10 parts of a colorant, from about 1 to 5 parts of nitrocellulose, up to about 45 parts of an alkyl acetate, and the remainder an alcohol and continuing said contact until a color coating is deposited on said metal part, said coating being of a thickness which will not interfere with oil impregnation of said part.

4,487,637

PURIFICATION OF NIOBIUM

Hasan S. Padamsee, Ithaca, N.Y., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.

Continuation-in-part of Ser. No. 542,808, Oct. 14, 1983,. This application Mar. 29, 1984, Ser. No. 594,592
Int. Cl.³ C21D *1/00*
U.S. Cl. 148—6.3 **6 Claims**



1. A method of purifying solid niobium containing an impurity having a significant diffusion rate above about 1000° C., which comprises vapor depositing yttrium metal at a temperature above about 1000° C. in a vacuum of at least about 10^{-4} torr and for a time sufficient to cause migration of said impurity from the niobium into said vapor deposited layer.

4,487,638

SEMICONDUCTOR DIE-ATTACH TECHNIQUE AND COMPOSITION THEREFOR

Carl E. Hoge, Encinitas, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Nov. 24, 1982, Ser. No. 444,267
Int. Cl.³ B23K *35/34*
U.S. Cl. 148—24 **13 Claims**

1. A semiconductor die-attach composition comprising:

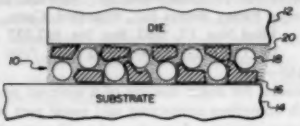
a low-melting metal powder having a melting point within the range of approximately 173° C. to 350° C.;

a high-melting powder having a melting point within the range of approximately 900° C. to 1100° C. and being soluble in said low-melting powder;

a vehicle for blending said low-melting powder with said high-melting powder so as to form a thick-film ink;

said low-melting metal powder and said high-melting metal

powder being combined in respective volume ratios of (40–70)% and (60–30)% to form a composition in which only a portion of said high-melting metal powder dissolves in and saturates the melt of said low-melting metal powder while the remainder of said high-melting metal powder stays in an undissolved solid state.



4,487,639

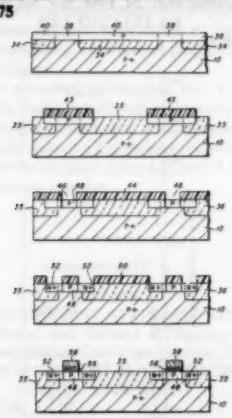
LOCALIZED EPITAXY FOR VLSI DEVICES

Hon W. Lam, and Ham-Tzong Yuan, both of Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 191,478, Sep. 26, 1980, abandoned. This application Jan. 7, 1983, Ser. No. 456,209

Int. Cl.³ H01L *21/263, 21/428*

U.S. Cl. 148—175 **6 Claims**



1. A method of fabricating an integrated circuit comprising the steps of:

depositing a layer of masking material on the surface of a monocrystalline semiconductor substrate;

forming a plurality of openings through said layer of masking material to expose selected surface areas of the monocrystalline semiconductor material of said substrate;

etching said exposed selected surface areas of monocrystalline semiconductor material of said substrate to a predetermined depth to define recesses in the surface of said substrate;

growing insulating material in the recesses in the surface of said substrate to a thickness defining an interrupted insulation layer having a surface substantially coplanar with the surface of said substrate, thereby forming a surface zone having areas of monocrystalline semiconductor material of said substrate bounded by areas of said insulating material;

removing said layer of masking material from the surface of said substrate;

depositing a non-monocrystalline semiconductor layer on said surface zone so as to cover said areas of monocrystalline semiconductor material of said substrate and said areas of said insulating material; and

annealing said non-monocrystalline semiconductor layer throughout the thickness thereof to induce epitaxial growth in the regions therein directly above and extending to the surface of said monocrystalline semiconductor material of said substrate.

4,487,640

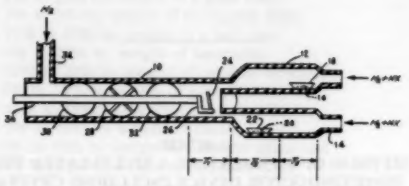
METHOD FOR THE PREPARATION OF EPITAXIAL FILMS OF MERCURY CADMIUM TELLURIDE

Thomas E. Erstfeld, Bedford, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 22, 1983, Ser. No. 468,781

Int. Cl.³ H01L *21/365, 29/221*

U.S. Cl. 148—175 **3 Claims**



1. A method for preparing and depositing an epitaxial crystalline film onto the surface of a semiconductor substrate crystallographically compatible with said film which comprises the steps of:

a. positioning a cadmium telluride substrate in a first deposition zone located at one end of an elongated reaction chamber while maintaining said first zone at a predetermined first temperature within a temperature range of about 850° to 900° K.;

b. positioning a first reactant source composed of $HgTe/Te_2$ in a second reactant zone located upstream from said first zone while maintaining said second zone at a predetermined second temperature within a temperature range of about 880° to 925° K. and which predetermined second temperature is at least 20° K. higher than the said predetermined first temperature of said first zone;

c. positioning a second reactant source composed of cadmium telluride in a third reactant zone located separately and adjacent to said second zone and upstream from said first zone while maintaining said third zone at a predetermined third temperature within a temperature range of from about 1080° to 1120° K. and which predetermined third temperature is at least 20° K. higher then the predetermined first temperature of said first zone;

d. passing a separate stream of a hydrogen halide gas selected from the group consisting of hydrogen bromide, hydrogen chloride and hydrogen iodide invididually over each of said first and second reactant sources to produce respective first and second gaseous reactants;

e. introducing said first and second gaseous reactants into saif first deposition zone to form a gaseous admixture; and

f. contacting said substrate with said admixture at said predetermined first temperature sufficient to effect the deposition of a (Hg,Cd)Te epitaxial crystalline film on the surface of said substrate.

4,487,641

METHODS OF AND APPARATUS FOR MAKING A RODENT AND LIGHTING PROTECTIVE CABLE SHEATH SYSTEM

William D. Bohannon, Jr., and Michael D. Kinard, both of Lawrenceville, Ga., assignors to AT&T Technologies, Inc., New York, N.Y.

Filed Nov. 15, 1983, Ser. No. 551,798

Int. Cl.³ H01B *13/22*

U.S. Cl. 156—54 **20 Claims**

1. A method of making a laminate which is suitable for use in a cable sheath system, said method including the steps of:

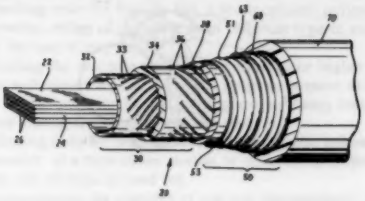
preheating a strip of a corrosion-resistant metallic material, which has at least a predetermined chromium content and a relatively high elongation, an oxide surface layer, and a

relatively coarse outer surface, to a temperature within a predetermined range;

moving a composite strip, which comprises a first adhesive material and a second adhesive material, and the strip of metallic material into engagement with each other with the first adhesive material engaging the strip of metallic material; while

exposing the composite strip and the strip of metallic material to a first temperature and to a predetermined pressure; and then

exposing the composite strip and the strip of metallic material to a second temperature that is higher than the first and to the predetermined pressure to form a laminate comprising the composite adhesive strip and the strip of metallic material.



4,487,642

METHOD OF PRODUCING MOISTURE-PERMEABLE ARTIFICIAL LEATHER

Katsuhiko Takashima, Sennan; Katsuhiro Moriwaki, and Koichi Taniguchi, both of Osaka, all of Japan, assignors to Toyo Cloth Co., Ltd., Sennan, Japan

Filed Jun. 9, 1983, Ser. No. 502,846

Claims priority, application Japan, Jan. 24, 1983, 58-10393

Int. Cl.³ B32B *5/18, 31/00;* **B44C** *3/00;* **C09J** *1/00*

U.S. Cl. 156—77 **5 Claims**

1. In a method of producing moisture-permeable artificial leather which comprises the steps of coating a release sheet with a dispersion of finely divided particles of a water-soluble inorganic salt in a polyurethane solution in an organic solvent; removing the solvent from the resulting film to provide a surface layer; bonding a base fabric onto said surface layer; removing said release sheet; and leaching said particles of said inorganic salts from said surface layer, the improvement wherein said dispersion is prepared by the steps of milling a mixture of said particles and a solution of a one-component polyurethane in said solvent until at least 90% of said particles have a particle size of not greater than 30 microns, and then thoroughly blending the thus-produced premix with a solution, free of said particles, of a hot laminating polyurethane in said solvent to form said dispersion; and wherein said base fabric and said surface layer are bonded together by pressing them under heat without any adhesive layer interposed therebetween, thereby producing an artificial leather suitable for clothing purposes with excellent surface appearance qualities, moisture permeability and wear resistance.

4,487,643

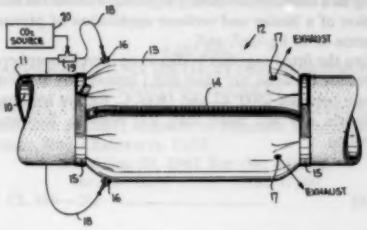
METHOD AND APPARATUS FOR REMOVING PROTECTIVE COATING FROM PIPE SECTION

William A. Eliett, 1607 Fairview Ave., Monroe, La. 71201

Filed Dec. 23, 1983, Ser. No. 565,211

Int. Cl.³ B32B *31/24*

U.S. Cl. 156—80 **19 Claims**



1. A method of providing access to a section of pipe disposed beneath a protective coating, said method comprising the steps of:

enclosing said pipe section in a sleeve member;

flowing a refrigerant fluid through said sleeve member in contact with said protective coating to lower the temperature of the protective coating sufficiently to render it brittle;

removing said sleeve member from said pipe section;

breaking the brittle protective coating by striking the coating.

4,487,644

BINDERLESS WELD-BONDING OF PRESHAPED SIC-BASE PARTS INTO SOLID BODIES

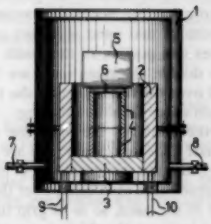
Ashok K. Gupta; Ernoe Gyarmati, both of Jülich; Hermann Kreutz, Monchen-Gladbach; Rudolf Muenzer, Alsdorf, and Aristides Naoumidis, Jülich, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Julich GmbH, Julich, Fed. Rep. of Germany

Filed Sep. 24, 1982, Ser. No. 423,458

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1981, 3139270

Int. Cl.³ C03B *29/00*

U.S. Cl. 156—89 **6 Claims**



1. Method of producing complex shaped bodies on a silicon carbide basis comprising the steps of:

prefabricating integral component bodies with polished boundary surfaces for fitting together with each other and thereby forming boundary surfaces, said component bodies having their boundary surfaces composed of a material

selected from the group of SiC and SiSiC, said composition being the same for at least a layer of the body adjoining the boundary surface, at least one component body of every pair of component bodies facing each other across a said boundary surface having a surface and at least a surface layer thereunder composed of SiSiC having excess silicon, with reference to the stoichiometric SiC composition, of at least 8% by weight, to a depth of about 10 μm, adjoining said boundary surface;

fitting said components closely together without the interposition of a binder and without application of pressure in excess of 10 kg/cm^2, and

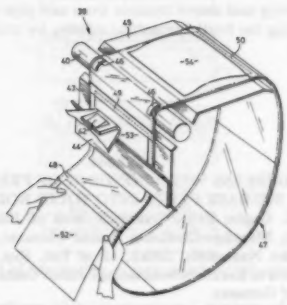
heating the fitted-together bodies in an inert atmosphere at a pressure between 10^{-3} torr and 1 atmosphere at a temperature between 1500° C. and 1800° C. for not less than 15 minutes and not more than 100 minutes, followed by cooling.

4,487,645

SHEET CARRIER FOR TRACTOR-FEED PRINTERS

Colin K. Weston, 1606 Springwell Ave., Mississauga, Ontario, Canada L5J 3H9

Filed Jul. 18, 1983, Ser. No. 514,466
Int. Cl.^{3} B32B *1/00*
U.S. Cl. 156—157 **19 Claims**



1. Carrier assembly, for carrying individual sheets of paper through a printer, the printer having a printing head, the assembly comprising a carrier sheet and pockets spaced along the carrier sheet;

wherein the pockets are formed by the provision of a double thickness band extending across the carrier sheet;

wherein the width of that band is in two contiguous portions, and over one portion of the width the two thicknesses of the double thickness band are firmly adhered together, and over the other portion the two thicknesses lie against each other without adhering;

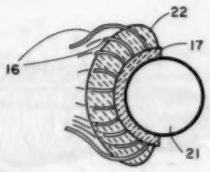
wherein, over the width of the band the thicknesses are substantially not folded or creased but are flat together in such a manner that the thicknesses lie in intimate surface-to-surface contact with each other over the non-adhering other portion of the band, so as to grip firmly a piece of paper inserted between the thicknesses; and wherein the said other portion of the band is relatively narrow, being of sufficient width only to grip a narrow margin at the edge of a piece of paper inserted between the thicknesses, so as to leave almost the whole of the piece of paper open to the printing head of the printer, being a piece of paper of a size commensurate with the spacing of the pockets.

4,487,646

METHOD FOR POSITIONING THE ENDS OF FIBRES IN A FIBRE OPTIC ARRAY

Paul M. Murray, Shipbourne, and John M. Free, Caterham, both of England, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 5, 1983, Ser. No. 558,132
Int. Cl.^{3} G02B *5/16*
U.S. Cl. 156—177 **6 Claims**



1. A method for positioning the ends of fibres in a fibre optic array such that each fibre terminates at a surface of predetermined arcuate shape and has its axis arranged substantially radially to that surface, comprising the steps of:

positioning said fibres in a flexible support;

cutting an end face through said flexible support such that the axis of each fibre is arranged in a predetermined orientation relative to said cut end face corresponding to the substantially radial direction the fibre is to adopt relative to said arcuate surface of predetermined shape;

applying said end face against the surface of a former, the shape of the former surface being arcuate and corresponding to said surface of predetermined shape; and

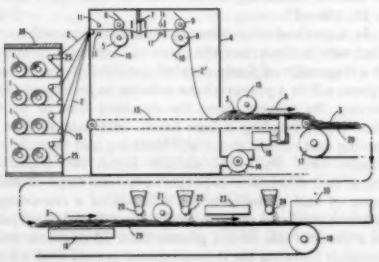
securing said fibre ends in the relative positions they thereby adopt.

4,487,647

PROCESS AND DEVICE FOR THE CONTINUOUS PRODUCTION OF GLASS FIBER REINFORCED SHEETS OF THERMOPLASTIC POLYMERS

Gian L. Semeghini, Ferrara; Roberto Ferrari, Vado Ligure; Vittorino Rizzotto, Albisola Superiore; Alberto Omacini, Milan, and Carlo Rossi, Olgiate Olona, all of Italy, assignors to Vitrofil S.p.A. and Montepolimeri S.p.A., both of Milan, Italy

Filed Jan. 27, 1983, Ser. No. 461,517
Claims priority, application Italy, Jan. 28, 1982, 19341 A/82
Int. Cl.^{3} B32B *31/00*
U.S. Cl. 156—181 **3 Claims**



1. A process for preparing thermoplastic polymer sheets reinforced with incorporated glass fibers, comprising, in the order, the following steps:

(a) preparing a mat of continuous glass strands, accomplished by deposition from above, onto the surface of a conveyor belt in motion, of glass strands having a count

ranging from 10 to 220 tex, the linear feeding speed of the strands being higher than the belt sliding speed;

(b) preheating the mat to a temperature lower than the melting temperature of the thermoplastic polymer utilized for producing the sheets in successive step (c), or of the polymer having the lowest melting temperature among the polymers used in successive step (c);

(c) feeding onto the preheating mat, by fall from above, a thermoplastic polymer in powder;

(d) compressing the mat with reduction of the original thickness to a value ranging from 3/7 to 1/5;

(e) feeding onto the mat, by fall, a thermoplastic polymer in powder, either of the same or of different type in respect of the one of step (c);

(f) heating the mat to a temperature equal to or higher than the softening temperature of the polymer present therein, or of the polymer having the highest softening temperature among those present in the mat;

(g) feeding onto the mat, by fall, a thermoplastic polymer in powder, of a type either similar or different in respect of the one of steps (c) and (e);

(h) compressing the complex of mat and thermoplastic polymer at a temperature higher by at least 50° C. than the melting temperature of the thermoplastic polymer, or at the melting temperature of the polymer having the highest melting temperature among the polymers present therein;

(i) stiffening such complex by cooling under pressure.

4,487,648

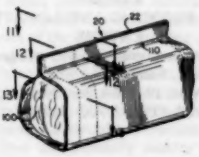
SIMPLIFIED METHOD FOR MANUFACTURING AN AIRTIGHT CELL

Bearge Miller, 2-B Governor Markham Dr., Glen Mills, Pa. 19342

Division of Ser. No. 198,628, Oct. 20, 1980, Pat. No. 4,396,814. This application Jun. 4, 1982, Ser. No. 385,015

Int. Cl.³ B32B *31/04, 1/02*

U.S. Cl. 156—227 **1 Claim**



1. A method for making an airtight cell from three separate rectangular sheets of material, whereby:

a first sheet, substantially rectangular in shape, forming the main wall of said airtight cell; and

a second sheet of material, substantially rectangular in shape, comprising one edge of said cell; and

a third sheet of material, substantially rectangular in shape, comprising a second edge of said cell; are combined to comprise a substantially elongate shape, formed by a combination of welding of said second sheet of material to said first sheet, and welding said third sheet of material to said first sheet, whereas further said second sheet is attached to said first sheet substantially toward one end of the first sheet; said third sheet is attached substantially toward the end of said first sheet which is directly opposite the end which has said second sheet attached thereto,

wherein said airtight cell is formed by the folding of said first sheet upon itself, across the direction which causes said first sheet to be folded about its longest longitudinal axis, wherein further said second sheet is folded such that its edge, said edge opposite the edge which is bonded to said first sheet, is folded in a fashion which brings each corner of said edge together at one point,

wherein said folded edge is drawn vertically such as to allow it to protrude above the edges of said first sheet as it is folded about said longest longitudinal axis,

said third sheet being folded in a fashion and processed identical to above described second sheet,

wherein then said edges of said first sheet are compressed against each other such as to hold said edges of said second and third sheet which are drawn vertically,

wherein said edge of said first sheet is welded onto itself, along said edges, further welded therebetween said vertically drawn edges of said second and third sheets.

4,487,649

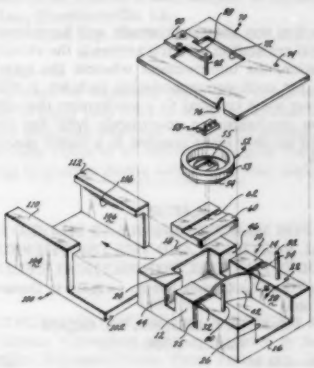
APPARATUS AND METHOD FOR ASSEMBLING COMPONENT PARTS

Ko Ko Gyi, Thousand Oaks, and Gurbachan S. Grewal, Sepulveda, both of Calif., assignors to Magnetic Information Technology, Inc., Chatsworth, Calif.

Filed Sep. 23, 1982, Ser. No. 421,892

Int. Cl.³ B29C *19/00*; B32B *31/00*

U.S. Cl. 156—293 **13 Claims**



1. As an article of manufacture, fixture means for assembling a magnetic slider head in a carrier member for the magnetic slider head, the carrier member having an opening in it in a surface thereof to receive the slider head, in combination, a fixture member having a cavity in it shaped to receive the carrier member and to hold the carrier member in position in the fixture member, the fixture member having further means to engage the slider head when positioned in the opening in the carrier member whereby to predetermine the amount of protrusion of the slider member from a surface of the carrier member, and a holding means for holding the carrier member in position and for holding the magnetic slider head in position in the fixture member while the carrier member and the slider head are secured together.

4,487,650

LABELING MACHINE

Hans-Werner Mohn, Kaarst, and Heinz-Jürgen Rosenberg, Neuss, both of Fed. Rep. of Germany, assignors to Jagenberg Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Mar. 9, 1984, Ser. No. 586,904

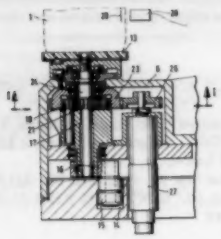
Claims priority, application Fed. Rep. of Germany, Mar. 12, 1983, 3308934

Int. Cl.³ B65C *9/04, 9/40*

U.S. Cl. 156—567 **8 Claims**

1. In a labeling machine for articles like bottles and comprising an intake star, a take-out star, a turntable positioned between the intake and take-out stars and having distributed around its circumference a plurality of accommodations in each of which an article will be secured between a rotating

plate and a rotating head while it is transported alongside a labeling station and alongside label applicators or contactors, a rotary drive mechanism with an invariable program, supplied by a stationary cam, to rotate the rotating plate and head during transport through the bottle holder, and controls with a sensor that detects an indication on the circumference of the article to orient the articles in a rotated position and control the rotary drive mechanism independently of the invariable pro-



gram in such a way that each article will be rotated into a desired initial orientation before it arrives in the vicinity of the labeling station, the improvement wherein the rotary drive mechanism for each accommodation includes a differential gear with one input coupled to a mechanism that drives the rotary drive mechanism in accordance with the invariable program and another input coupled to a motor governed by the controls.

4,487,651

METHOD FOR MAKING IRREGULAR SHAPED SINGLE CRYSTAL PARTICLES AND THE USE THEREOF IN ANODES FOR ELECTROCHEMICAL CELLS

Chih-Chung Wang, Lexington, Mass., assignor to Duracell Inc., Bethel, Conn.

Filed Apr. 6, 1983, Ser. No. 482,651

Int. Cl.[3] **C30B** *29/60*

U.S. Cl. 156—616 R **13 Claims**

1. A method for making single crystal metal particles comprising the steps of:

(a) forming individual substantially continuous coatings on the external surfaces of each of the individual particles of a particulate metal material which is capable of being crystallized, said coatings being of a material having higher melting and decomposition temperatures than the melting temperature of said particulate metal material and wherein said coatings are each of a thickness and composition with sufficient mechanical strength to act as self-supporting shape retaining crucibles for said metal particles when such metal particles are melted;

(b) raising the temperature of said coated particulate metal material to above the melting point thereof but below the lower of the melting point or the decomposition temperature of said coating material whereby substantially all of the particulate metal material is melted within said coating; and

(c) slowly cooling said particulate metal material whereby substantially all of said particles become individual single metal crystals.

4,487,652

SLOPE ETCH OF POLYIMIDE

Carl W. Almgren, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 30, 1984, Ser. No. 595,229

Int. Cl.[3] **B44C** *1/22;* **C03C** *15/00, 25/06*

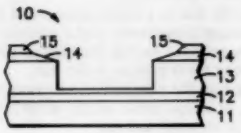
U.S. Cl. 156—643 **8 Claims**

1. In a semiconductor having an insulating layer overlying a metal layer, wherein the insulator comprises an upper oxide layer, an intermediate polyimide layer, and a lower oxide layer in contact with the metal layer, a method for etching a via from an upper surface of the polyimide layer to the metal layer comprising the steps of:

applying photoresist;

etching an opening from an upper surface of the photoresist layer to the upper oxide layer at a location for forming the via so that an upper surface of the upper oxide layer is exposed at the via location;

heating the photoresist to cause a more gradual slope of the photoresist layer from the upper surface of the upper oxide layer at the via location to the upper surface of the photoresist layer;



applying reactive ion etchant with a predetermined selectivity between photoresist and oxide to transfer the slope of the photoresist layer to the upper oxide layer at a predetermined ratio; and

applying a reactive ion etchant with a predetermined selectivity between oxide and polyimide to transfer the slope of the upper oxide layer to the polyimide layer at a predetermined ratio, whereby the lower oxide layer is simultaneously etched to expose the metal layer at the via location.

4,487,653

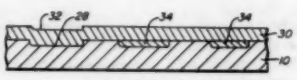
PROCESS FOR FORMING AND LOCATING BURIED LAYERS

Owen W. Hatcher, Sunnyvale, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Mar. 19, 1984, Ser. No. 590,678

Int. Cl.[3] **B44C** *1/22;* **C03C** *15/00;* **B05D** *5/12;* **H01L** *7/36*

U.S. Cl. 156—644 **7 Claims**



1. A method for marking an integrated circuit to facilitate mask alignment, said method comprising the following steps:

(a) forming a silicon dioxide layer on the substrate;

(b) etching a predetermined pattern in said silicon dioxide layer, said pattern including one or more alignment mark holes formed over inactive regions of the substrate;

(c) stopping the etch of step (b) prior to exposing the underlying substrate;

(d) depositing a photoresist layer over the silicon dioxide layer to fill in the pattern formed in step (b);

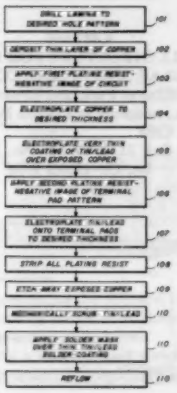
(e) exposing and developing the photoresist layer to remove photoresist from the alignment mark holes only; and

(f) etching the substrate to remove the remaining silicon dioxide from the alignment mark hole and to further form a recess in the substrate, whereby the recess may be used for alignment of active regions in subsequently deposited layers while the remainder of the substrate surface is substantially flat.

4,487,654
METHOD OF MANUFACTURING PRINTED WIRING BOARDS

James A. Coppin, Coquitlam, Canada, assignor to AEL Microtel Limited, Burnaby, Canada

Filed Oct. 27, 1983, Ser. No. 546,230
Int. Cl.³ C23F 1/02; C25D 5/02, 5/34; B44C 1/22
U.S. Cl. 156—645 23 Claims



10. In a method of fabricating a printed circuit board with a desired electrical circuit pattern having a solder mask over at least a portion of the circuit pattern other than pads and any plated through holes, from a board having a first conductive material on at least one side thereof and on the walls of any holes therethrough and including the steps of plating a tin-lead alloy of at least approximate eutectic composition of a desired thickness in areas of the first conductive material corresponding to pads and holes, providing a metallic etch resist over parts of the first conductive material corresponding to other than pads and holes of the pattern, etching away first conductive material so as to produce the deserved circuit pattern therein, and applying the solder mask to the circuit board, the improvement wherein said step of providing comprises providing a thin coating of the solder alloy over the prescribed portions of the conductive material in a thickness which is insufficient for it to flow detrimentally and/or noticeably at the temperature used in a subsequent operation such as wave soldering of the printed circuit board assembly; the thin coating of tin-lead not being removed from said portion of the conductive material prior to applying the solder mask to the circuit board.

4,487,655
PROCESS OF AND COMPOSITION FOR DE-INKING WASTE PAPER AS WELL AS PAPER RECLAIMED BY SAID PROCESS

Siegfried Nötzel, Wilhelmsfeld; Margarete Scholl, Mannheim, and Heinz Ballreich, Neulussheim, all of Fed. Rep. of Germany, assignors to Benckiser-Knapsack GmbH, Ladenburg, Fed. Rep. of Germany

Continuation of Ser. No. 384,926, Jun. 4, 1982, abandoned. This application Apr. 6, 1984, Ser. No. 597,215
Claims priority, application Fed. Rep. of Germany, Jun. 10, 1981, 3122911
Int. Cl.³ D21C 5/02
U.S. Cl. 162—5 4 Claims

1. A process for de-inking paper by the flotation de-inking process comprising the steps of:

forming waste paper into a paper pulp; and

subjecting said paper pulp to a de-inking composition, comprising:

a substance selected from the group consisting of sodium hydroxide, sodium peroxide, a combination of sodium hydroxide and sodium peroxide, and hydrogen peroxide; and

a mixture of 1,2,4-tricarboxy butane-2-phosphonic acid, and an amino alkane phosphonic acid; the proportion of 1,2,4-tricarboxy butane-2-phosphonic acid to amino alkane phosphonic acid in said de-inking composition being in the range from about 4:1 to 1:4, and the phosphonic acid mixture being present in an amount between about 0.02 weight percent and 2.0 weight percent based upon the amount of waste paper.

4,487,656
PROCESS FOR BLEACHING PAPER PULP USING MELAMINE AS A VISCOSITY STABILIZER

G. Graham Allan, Seattle, Wash., assignor to Melamine Chemicals, Inc., Donaldsonville, La.

Filed Sep. 30, 1983, Ser. No. 537,876
Int. Cl.³ D21C 9/12, 9/14
U.S. Cl. 162—73 7 Claims

1. A process for bleaching paper pulp comprising: adding melamine to paper pulp prior to or during at least one stage of a chlorine bleaching sequence wherein the melamine added is in an amount effective to maintain the pulp viscosity while enhancing brightness during said at least one bleach stage.

4,487,657
METHOD FOR PREPARING A FIBROUS SHEET

Daniel Gomez, Charavines, France, assignor to Société Anonyme dite: Arjomari-Prioux, Paris, France

Continuation of Ser. No. 049,574, Jun. 18, 1979, abandoned. This application Jul. 2, 1981, Ser. No. 279,850
Claims priority, application France, Jun. 20, 1978, 78 18447; Jan. 24, 1979, 79 91833; Apr. 24, 1979, 79 10386
Int. Cl.³ D21H 3/00
U.S. Cl. 162—158 33 Claims

1. In a method of preparation of a generally filler-containing fibrous sheet by a wet paper making procedure from an aqueous suspension of fibers, the improvement comprising preparing the aqueous suspension by the essential successive steps of:

(a) preparing an aqueous mixture of non-binding inorganic filler and fibers present in a ratio R wherein either the mechanical properties of the fibrous sheet are substantially improved for a given filler to fiber ratio or the mechanical properties of the fibrous sheet are maintained when the filler to fiber ratio is substantially increased;

(b) initiating flocculation by introducing 0.01 to 4 parts be weight of a flocculating agent into a quantity of the aqueous mixture comprising 100 parts by dry weight of said aqueous mixture of (a);

(c) incorporating an organic binder in the initially flocculated mixture of (b);

(d) introducing 0.01 to 6 parts by weight of a flocculating agent, on the basis of the dry weight of 100 parts of said mixture of non-binding filler and fibers, to produce said aqueous suspension;

(e) forming under generally ambient temperature conditions a wet filler-containing fibrous sheet from the aqueous suspension of (d) by a paper making procedure whereby underwire losses are substantially minimized and or drainage time is substantially reduced; and

(f) drying the sheet.

4,487,658

AQUEOUS NEUTRALIZING AND LUBRICATING COMPOSITION FOR DIESEL ENGINES

Brunello Cluti, S.Donato Milanese, Italy, assignor to Agip Petroli S.p.A, Rome, Italy

Continuation of Ser. No. 327,687, Dec. 4, 1981, abandoned. This application Sep. 1, 1983, Ser. No. 528,526
Claims priority, application Italy, Dec. 23, 1980, 26903 A/80
Int. Cl.³ C10M 3/34
U.S. Cl. 252—33.2 16 Claims

1. A neutralizing and lubricating composition which comprises:

(a) from 2 to 20% on a weight basis of an antacid substance selected from the group consisting of magnesium acetate, calcium acetate, acetylmorpholine, magnesium formate, sodium acetate, sodium carbonate and mixtures thereof;

(b) from 2 to 20% on a weight basis of a water soluble organic substance selected from the group consisting of ethylene glycol, propylene glycol, polyethylene glycol and polypropylene glycol;

(c) from 0.5% to 5% on a weight basis of a capillary active agent selected from the group consisting of oxyethylated sorbitol oleate, ammonium dodecylbenzene sulfonate, diethanolamine lauryl sulfate, monoethanolamine lauryl sulfate and alkyldimethylammonium chloride; and

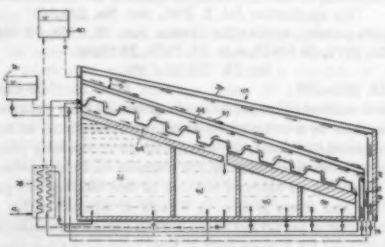
(d) a major amount of water.

4,487,659

SOLAR DISTILLATION APPARATUS

Virgil Stark, New York, N.Y., assignor to North American Utility Construction Corp., New York, N.Y.

Continuation-in-part of Ser. No. 44,901, Jun. 4, 1979, Pat. No. 4,323,052, which is a continuation-in-part of Ser. No. 1,175, Jan. 5, 1979, abandoned, which is a continuation-in-part of Ser. No. 915,001, Jun. 13, 1978, Pat. No. 4,270,981, and Ser. No. 920,288, Jun. 29, 1978, Pat. No. 4,289,118. This application Oct. 23, 1980, Ser. No. 200,019
The portion of the term of this patent subsequent to Jun. 2, 1998, has been disclaimed.
Int. Cl.³ C02F 1/14
U.S. Cl. 202—172 40 Claims



1. Apparatus for distilling liquids utilizing solar energy comprising:

(a) means for conducting the liquid to be distilled at an acute angle with respect to the horizontal;

(b) conduit means transparent to visible light for conducting a liquid therethrough in a heat exchange relationship with the conduit means, the conduit means being disposed above said means for conducting so as to conduct liquid therethrough at an acute angle with respect to the horizontal generally in the same direction as the liquid conducted by the means for conducting and allow solar energy to pass through said conduit means and be received without substantial concentration in or on the means for conducting;

(c) means supplying liquid to said conduit means for assisting the condensation on said conduit means of liquid evaporated from said means for conducting and absorbing heat released by the condensing liquid, the supplying means providing sufficient liquid to the conduit means and the conduit means being structured such that a substantial amount of liquid passes through the conduit means unevaporated and absorbs heat released by the liquid condensing on the conduit means while assisting the condensation on said conduit means of liquid evaporated from said means for conducting; and

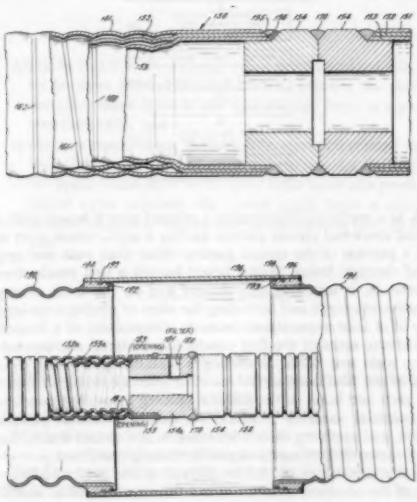
(d) means for collecting the condensed liquid.

4,487,660

MULTIPLE WALL STRUCTURE FOR FLEXIBLE CABLE USING TUBULAR AND SPIRAL CORRUGATIONS

Philip C. Netzel, Milmont Park, and Edward M. Spencer, Chalfont, both of Pa., assignors to Electric Power Research Institute, Palo Alto, Calif.

Filed Oct. 31, 1980, Ser. No. 202,452
Int. Cl.³ H01B 9/06
U.S. Cl. 174—28 12 Claims



1. A flexible gas-insulated electrical cable; said gas-insulated cable comprising an elongated flexible tubular outer electrically conductive housing; an elongated flexible central electrical conductor extending coextensively with and insulated from said outer housing; a plurality of insulator support devices spaced along the axis of said cable and connected to and supporting said central conductor along the axis of said flexible cable and a dielectric gas under positive pressure filling the interior of said tubular outer housing; said central conductor comprising a plurality of concentric elongated flexible hollow electrically conductive tubes of approximately equal wall thickness in close radial relationship to one another; said tubes forming the major current carrying bodies of said cable; said plurality of tubes being independently slidable relative to one another, whereby said plurality of concentric elongated tubes are flexible independently of one another.

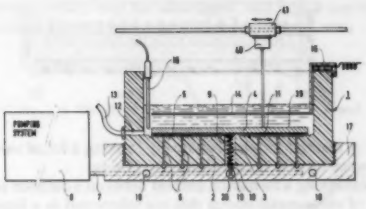
6. A flexible electrical conductor comprising a plurality of concentric parallel connected elongated flexible hollow electrically conductive tubes in close radial relationship to one another and of approximately equal wall thickness; said plurality of tubes being independently slidable relative to one another, whereby said plurality of concentric elongated tubes are flexible independently of one another; the annular space between said tubes being gas filled.

4,487,661

METHOD AND DEVICE FOR DETERMINING THE PHYSICAL CHARACTERISTICS OF A SEMICONDUCTOR MATERIAL

Jean-Yves Barraud, Paris; Gérard Tourillon, Bouffemont, and Francois Arnould, Ollainville, all of France, assignors to Compagnie Generale D'Electricite, Paris, France

Filed Sep. 8, 1983, Ser. No. 530,449
Claims priority, application France, Sep. 8, 1982, 82 15215
Int. Cl.³ G01N 27/46
U.S. Cl. 204—1 T 15 Claims



1. A method of determining the physical characteristics of a semiconductor material by use of an insulative container, comprising the following consecutive steps:

removably applying a wafer of said material to the base of said insulative container having a hole in the base so as to cover said hole,

placing an electrolyte in said container so that a first side of said wafer constituting a working electrode is in contact with said electrolyte,

disposing an auxiliary electrode in said electrolyte opposite said working electrode,

connecting a direct current electrical power source between a second side of said wafer and said auxiliary electrode, and

determining the characteristics of said wafer by examining said first side,

the improvement wherein said container base is flat, having an internal wall, a plurality of side by side evacuating grooves formed within said flat base internal wall and covering the full surface area of said wafer second side, and said method further comprising the steps of:

evacuating said grooves formed in said wall via passageways formed in the base of said container open to said grooves and connected to a vacuum pump system external to said container,

closing off said hole in said container in an electrolyte-tight manner,

connecting said second side of said wafer to said power source by connecting that part thereof opposite said hole through said hole to said power source,

connecting said working and auxiliary electrodes to said power source for a predetermined time interval, and

determining said characteristics at the end of said predetermined time interval.

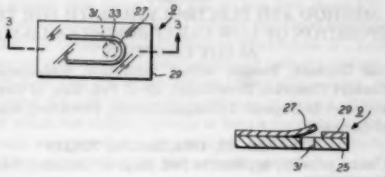
6. A device for determining the physical characteristics of a semiconductor material, comprising a container, means for placing an electrolyte in and removing said electrolyte from said container, a substantially plane internal wall in said container adapted to permit a wafer of said semiconductor material to be disposed within said container against said wall so that a first side thereof is in contact with the electrolyte when said container contains electrolyte, evacuating grooves in said wall, a base in said container, a hole in said base, passageways in said base whereby said grooves communicate with the exterior of said container, a vacuum pump system connected to said passageways and adapted to evacuate said grooves so as to apply removably a second side of said wafer against said wall, an auxiliary electrode, removable means for placing said auxiliary electrode in said container, a direct current electrical power source, means for electrically connecting one terminal of said source to said auxiliary electrode, and means for connecting the other terminal of said source via said hole to that portion of said first side of said wafer opposite said hole.

4,487,662

ELECTRODEPOSITION METHOD FOR CHECK VALVE

Kenneth H. Fischbeck, Dallas, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed Sep. 20, 1982, Ser. No. 422,405
Int. Cl.³ C25D 5/02; F16K 15/16; G01D 15/18; B21D 53/00
U.S. Cl. 204—15 1 Claim



1. The method of forming a check valve by electrochemical deposition on a substrate for a pulsed pressure drop ejecting apparatus which comprises:

(a) providing a substrate having a surface adapted for electrochemical deposition thereon, said substrate including a channel therethrough;

(b) plugging said channel with a removable plug;

(c) forming a substantially "U"-shaped pattern on said surface of said substrate encompassing said plug of a material which will inhibit electrochemical deposition;

(d) providing on said surface of said substrate within said substantially "U"-shaped pattern of inhibiting material a passivating material which is electrically conductive and tenously bonded to said surface;

(e) electrochemically depositing a layer on said surface and said passivating material until a deposition of the desired thickness is formed; and

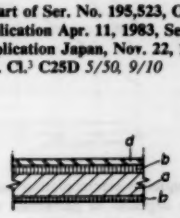
(f) removing said removable plug.

4,487,663

STEEL SHEETS FOR PREPARING WELDED AND COATED CANS AND METHOD FOR MANUFACTURING THE SAME

Tomihiro Hara, Yokohama; Hiroshi Kagechika, Kawasaki; Satoshi Doi, Yokohama, and Yoshinori Yomura, Kawasaki, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 195,523, Oct. 9, 1980, abandoned. This application Apr. 11, 1983, Ser. No. 483,673
Claims priority, application Japan, Nov. 22, 1979, 54-150579
Int. Cl.³ C25D 5/50, 9/10
U.S. Cl. 204—27 7 Claims



1. A method for manufacturing steel sheets for welded and coated cans comprising the steps of preparing a steel sheet substrate, depositing on said substrate 0.05–0.7 g/m^2 of tin, heating in a reducing atmosphere said substrate covered with the tin layer for a time and to a temperature sufficient to form a Fe—Sn alloy layer whose iron content is 40 to 80 atomic

percentage, all of the tin of the tin layer having been alloyed with iron of said substrate to form said Fe—Sn alloy layer, quenching and cooling said substrate covered with said Fe—Sn alloy layer to form an oxide film containing both of iron and tin oxides on said Fe—Sn alloy layer, and subjecting the resulting sheet to a cathodic dichromate treatment thereby converting said oxide film to a composite oxide film containing Fe, Sn, Cr and O, the quantities of Fe and Cr in said composite oxide film being 1–5 mg/m^2 and 2–10 mg/m^2, respectively.

4,487,664

METHOD AND ELECTROLYTIC BATH FOR THE DEPOSITION OF LOW CARAT BRIGHT GOLD-SILVER ALLOY COATINGS

Bernd Dorbath, Hanau; Rainer Schlodder, Rodenbach, and Norbert Giesecke, Bruchkobel, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Mar. 13, 1984, Ser. No. 589,216

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1983, 3309397

Int. Cl.^{3} C25D *3/62, 3/64*

U.S. Cl. 204—44.3 **19 Claims**

1. An electrolytic bath suitable for the deposition of a low carat, bright gold-silver-alloy coating consisting essentially of an aqueous solution containing 0.5 to 25 g/l gold in the form of alkali gold cyanide, 0.25 to 15 g/l silver in the form of alkali silver cyanide, 10 to 200 g/l alkali cyanide and 0.0005 to 5 g/l tellurium in the form of a water soluble tellurium compound.

4,487,665

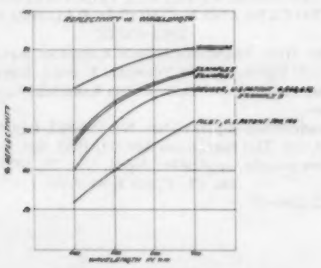
ELECTROPLATING BATH AND PROCESS FOR WHITE PALLADIUM

Kathleen B. Miscioscio, Bayside, N.Y., and Paul T. Smith, Pascoag, R.I., assignors to OMI International Corporation, Warren, Mich.

Filed Dec. 17, 1980, Ser. No. 217,319

Int. Cl.^{3} C25D *3/52*

U.S. Cl. 204—47 **4 Claims**



1. A stable, aqueous electroplating bath suitable for obtaining thin white deposits of palladium metal which consists essentially of a bath soluble source of pure palladium metal free of alloying elements, which source is present in an amount sufficient to provide from about 0.1 to 20 g/l palladium in the bath, from about 25 to 120 g/l of a bath soluble ammonium conductivity salt, from about 0.5 to 5 g/l of an organic brightener selected from Class I and Class II nickel brighteners, from about 0.1 and 1 g/l of an inorganic brightener and 2.5 to 15 g/l of chloride ions furnished by potassium chloride.

4,487,666

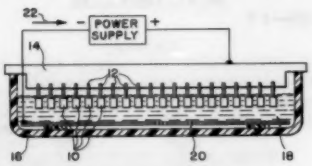
ELECTROLYTICALLY FORMING A LOT OF VALVE-METAL-BODIES FOR USE IN CAPACITORS

James S. Bates, East Lebanon, Me., assignor to Sprague Electric Company, North Adams, Mass.

Filed Mar. 30, 1984, Ser. No. 595,207

Int. Cl.^{3} C25D *11/02, 11/34*

U.S. Cl. 204—56 R **19 Claims**



1. A method for electrolytically forming a lot of valve-metal-bodies for use in capacitors comprising:

establishing a formation current between a cathode and a lot of valve-metal-bodies that are submersed in a liquid electrolyte;

monitoring said current and periodically measuring the capacitance of said bodies in said electrolyte to progressively more accurately define the characteristic formation properties of said lot; and

periodically, after each said capacitance measurement, predicting from what is thus far known of said characteristic formation properties an accumulated charge that will produce a capacitance value nearer to a predetermined target value, and continuing to form said bodies to said predicted charge before the next of said periodic capacitance measurements.

stopping said formation current and removing said bodies from said electrolyte when said capacitance from said measuring falls within a predetermined range of capacitance values.

4,487,667

POLYMETHYLENE PYRROLES AND ELECTRICALLY CONDUCTIVE POLYMERS THEREOF

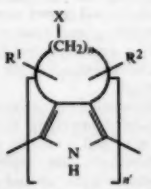
Lee Traynor, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed May 16, 1983, Ser. No. 494,752

Int. Cl.^{3} C25B *1/00*

U.S. Cl. 204—59 R **6 Claims**

1. A substituted pyrrole polymer ("polypyrrole") linked through N-adjacent carbon atoms of the pyrrole nucleus, said polymer being represented by the structure:



wherein,

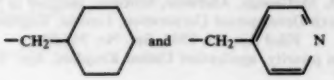
n' is an integer in the range from 2 to about 100, and more preferably in the range from about 20 to about 80;

n is an integer in the range from 3 to about 5, so that at least one C atom in the polymethylene ring is distally located relative to the 3- and 4-C atoms on the pyrrole ring;

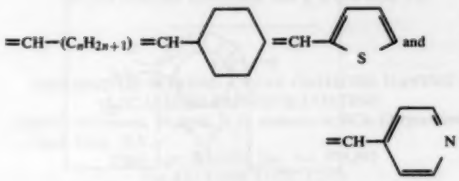
R^1 and R^2, if present, are independently selected from phenyl, hydroxyphenyl, cycloalkyl having from 4 to about 7 carbon atoms, lower alkyl, alkoxy and hydroxyal-

kyl each having from 1 to about 6 carbon atoms, and each substituent may be on the same C atom, or different C atoms, distally located from the 3- and 4-C atoms of the pyrrole ring; and,

X, if present, is selected from the group consisting of



either of which may be substituted, and which are connected to the alkylene ring with a single bond; and,



any of which may be substituted, and which are connected to the alkylene ring with a double bond.

4,487,668

FLUORINATED ION EXCHANGE POLYMER CONTAINING CARBOXYLIC GROUPS, AND FILM AND MEMBRANE THEREOF

David C. England, and Paul R. Resnick, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 347,087, Feb. 8, 1982, abandoned, which is a continuation of Ser. No. 207,501, Nov. 17, 1980, abandoned, which is a continuation of Ser. No. 789,725, Apr. 20, 1977, abandoned. This application Aug. 25, 1983, Ser. No. 526,397

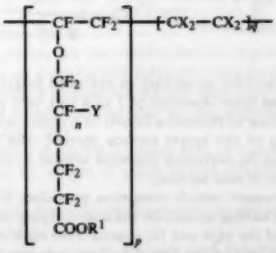
Int. Cl.³ C25B *1/14*

U.S. Cl. 204—98 **9 Claims**

1. A film or membrane having a base layer of a fluorinated ion exchange polymer which has pendant side chains with terminal groups consisting essentially of $-CF_2CF_2SO_2R^2$ wherein R^2 is F, Cl or OR^3; R^3 is H, or

$$M_{\frac{(1)}{t}};$$

M is alkali metal, ammonium or quaternary ammonium; and t is the valence of M and having on at least one surface thereof a layer consisting essentially of a polymer having the repeating units



wherein

n is 1 or 2,

p is 1 to 10,

q is 3 to 15,

the X's taken together are four fluorines or three fluorines and one chlorine,

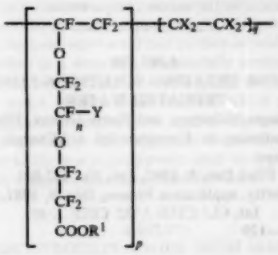
Y is F or CF_3,

R^1 is H, lower alkyl or

$$M_{\frac{(1)}{t}},$$

M is alkali metal, ammonium or quaternary ammonium, and t is the valence of M, each layer having an equivalent weight no greater than about 1500 and no less than about 625.

9. In a process of production of halogen and metal hydroxide of an alkali, or combinations thereof, by electrolysis of a halide of said metal employing separate anode and cathode sections in an electrolytic cell, the improvement comprising passing ions of said metal through the film or membrane of claim 1, the base layer of which has sulfonyl groups at least a majority of which are present as ion exchange sites in ionic form, and the surface layer of the polymer having the repeating units



wherein

n is 1 or 2,

p is 1 to 10,

q is 3 to 15,

the X's taken together are four fluorines or three fluorines and one chlorine,

Y is F or CF_3,

R^1 is H, lower alkyl or

$$M_{\frac{(1)}{t}},$$

M is alkali metal, ammonium or quaternary ammonium, and t is the valence of M,

facing the cathode portion of the cell.

4,487,669

METHOD FOR OXIDATION OF AN ELEMENT IN BOTH COMPARTMENTS OF AN ELECTROLYTIC CELL

Theodore Kuwana, Worthington, Ohio, assignor to Koppers Company, Inc.

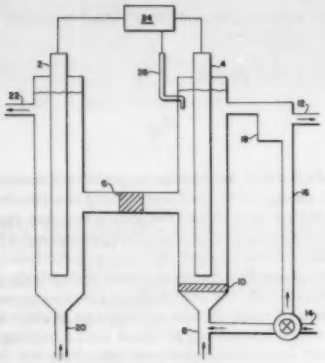
Filed Jan. 31, 1983, Ser. No. 462,310

Int. Cl.³ C25B *1/00, 1/30*

U.S. Cl. 204—101 **20 Claims**

1. A method of oxidizing an element in both compartments

of an electrolytic cell which comprises reducing O_2 with a reducing agent contained in the cathode compartment to



H_2O_2 which H_2O_2 oxidizes the element, and directly oxidizing the same element in the anode compartment.

4,487,670

PROCESS FOR TREATING SOLUTIONS CONTAINING TRITIATED WATER

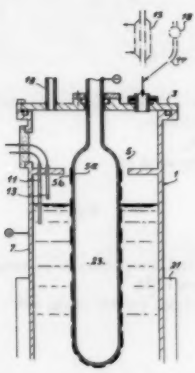
Gilbert Bellanger, Selongey, and Pierre Giroux, Dijon, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Dec. 8, 1982, Ser. No. 447,801

Claims priority, application France, Dec. 9, 1981, 81 23033

Int. Cl.³ C25B *1/02*; C02F *1/46*

U.S. Cl. 204—129 **7 Claims**



1. A process for treating or processing a solution containing tritiated water, wherein it comprises:

(a) adding to the solution an electrolyte chosen in such a way that the solution obtained can release tritium in the gaseous state by electrolysis;

(b) subjecting the thus obtained solution to electrolysis in such a way as to bring about a tritium release by working in an electrolytic cell having a metal cathode which assists tritium diffusion, said cathode forming a separating wall between the solution to be electrolysed and a tritium reception compartment, the surface of the cathode which is in contact with the solution to be electrolysed being coated with a porous palladium black deposit;

(c) and recovering in said compartment, the tritium desorbed by the cathode.

4,487,671

METHODS AND APPARATUS FOR THE ELECTRICAL MACHINING OF A WORKPIECE

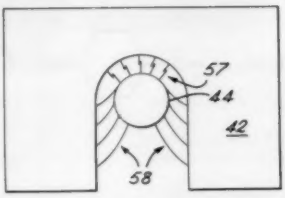
Joseph A. McGeough, Aberdeen, Scotland, assignor to National Research Development Corporation, London, England

Filed Apr. 13, 1982, Ser. No. 368,091

Claims priority, application United Kingdom, Apr. 15, 1981, 8111907

Int. Cl.³ B23P *1/04*

U.S. Cl. 204—129.1 **1 Claim**



1. A method of removing material from a workpiece including

positioning the workpiece in a container,

just covering the workpiece with an electrolyte,

adding a layer of dielectric liquid which floats on, and does not significantly mix with the electrolyte,

moving an electrode towards the workpiece until the electrode is in the immediate region of the interface between the electrolyte and the dielectric liquid, and

applying an intermittent unidirectional voltage between the electrode and the workpiece in a sense which causes material to be removed from the workpiece by electrolytic action, the dimensions of the gap between the electrode and the workpiece and the applied voltage being such that a current-carrying discharge takes place between the electrode and the workpiece at times while the voltage is applied.

4,487,672

METHOD FOR DECREASING CORROSION OF INTERNAL SURFACES OF METALLIC CONDUIT SYSTEMS

John B. Vrable, Delmont, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Nov. 1, 1982, Ser. No. 438,130

Int. Cl.³ C23F *13/00*

U.S. Cl. 204—148 **9 Claims**

1. In a method for protecting an extended length of a metal pipe having an inner diameter of 1 to 4 feet, said pipe having intermittent flow of corrosive liquids of a nature which results in the drying of the invert surface thereof, and said invert surface having its corrosion potential altered to decrease the corrosion rate of said surface,

the improvement which comprises providing segment-like elements having an arcuate portion, (i) lying on the invert surface of the pipe and (ii) spaced from each other, along the linear axis of the invert surface, wherein the arcuate portion conforms to the invert surface of the pipe, so as to

dam the flow of the liquid along said linear axis and prevent the liquid from completely emptying during the periods when the input thereof is substantially decreased, wherein the central altitude, a, of said segment-like elements is (i) not so high as to prevent the pipe from functioning as a conduit for said liquid, (ii) is at least 0.05 times the pipe I.D., in feet, and (iii) is not substantially less than that determined by:

$$a = d \times g/100,$$

where

d is the spaced-apart distance, in feet, between said elements and

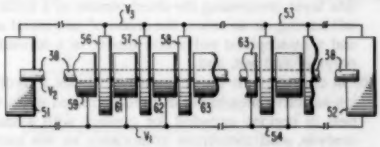
g is the grade, in percent, at which the pipe length is sloped from the horizontal, and g is less than 3%.

4,487,673

METHOD OF MAKING A LINE CATHODE HAVING LOCALIZED EMISSIVE COATING

Carl C. Steinmetz, Trenton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 21, 1982, Ser. No. 370,582
Int. Cl.³ C25D *13/02, 13/16*
U.S. Cl. 204—181 R **6 Claims**



1. A method of depositing electron emissive material onto localized areas of a line filament comprising the steps of

arranging a plurality of conductive cylinders coaxially about said filament, said cylinders having a width approximately equal to the desired length of said areas;

submerging said filament and said cylinders in a solution of electron emissive material;

applying a first voltage to said filament and a second voltage, more positive than said first voltage, to said cylinders for a prescribed time.

4,487,674

PROCESS FOR ELECTROPHORETIC FILM DEPOSITION ACHIEVING INCREASED FILM THICKNESS

René Jan Al, and John W. Krise, Jr., both of Bradford, Pa., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Apr. 1, 1983, Ser. No. 481,186
Int. Cl.³ C25D *13/10*
U.S. Cl. 204—181 R **75 Claims**

43. A process for the electrophoretic deposition of an organic film on a conductive substrate comprising:

(a) providing an aqueous organic resin bath formed from:

(i) an organic resin suitable for electrophoretic deposition,

(ii) water, and

(iii) from about 3% to about 40% of a compatible surfactant by weight of solids in said aqueous organic resin bath;

(b) placing the conductive substrate in said aqueous organic resin bath; and

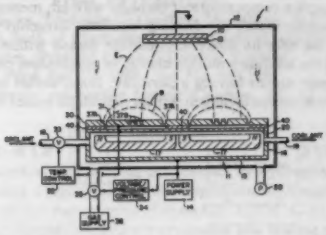
(c) passing a current through said substrate effective to deposit said organic resin upon said conductive substrate.

4,487,675

MAGNETICALLY-ASSISTED SPUTTERING METHOD FOR PRODUCING VERTICAL RECORDING MEDIA

Benjamin B. Meckel, Rte. 1, Box 52M, Del Mar, Calif. 92104

Continuation-in-part of Ser. No. 462,564, Jan. 31, 1983, Pat. No. 4,414,087. This application Oct. 28, 1983, Ser. No. 546,411
The portion of the term of this patent subsequent to Nov. 8, 2000, has been disclaimed.
Int. Cl.³ C23C *15/00*
U.S. Cl. 204—192 M **2 Claims**



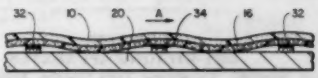
1. A magnetically-assisted sputtering method for producing vertical recording media comprising a substrate and a magnetic film disposed upon a surface portion of said substrate and magnetizeable in a direction substantially normal to said surface portion, said method comprising the steps of heating a magnetic target formed from material which produces said magnetic film to a temperature not less than about its Curie temperature to render said target non-magnetic, and sputtering said target while in a non-magnetic state to deposit said material as said magnetic film upon said substrate.

4,487,676

ANTICORROSION ANODE WITH MAGNETIC HOLDDOWN

Robert Parker, Alamo, and James P. Reed, Mountain View, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Aug. 27, 1981, Ser. No. 296,767
Int. Cl.³ C23F *13/00*; C25B *11/00*
U.S. Cl. 204—196 **10 Claims**



10. A method for locating a flexible elongate anode within a hollow corrodible metal substrate which comprises:

(a) attaching to said anode, at at least a plurality of points along its length, a flexible electrically non-conductive permanent magnet material;

(b) inserting said anode into the substrate; and

(c) causing said magnet material to adhere to the substrate, whereby said anode is located in proximity to, but electrically insulated from, the substrate.

4,487,677

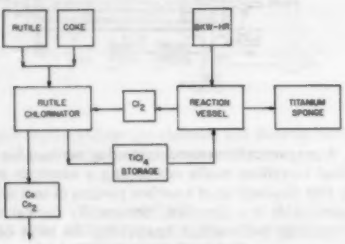
ELECTROLYTIC RECOVERY SYSTEM FOR OBTAINING TITANIUM METAL FROM ITS ORE

Andrew H. Murphy, Naples, Fla., assignor to Metals Production Research, Inc., Media, Pa.

Filed Apr. 11, 1983, Ser. No. 483,502
Int. Cl.³ C22B *34/12, 3/02*; C25C *7/06, 3/04*
U.S. Cl. 204—247 **39 Claims**

17. In an apparatus for producing titanium metal in sponge

form by the electrolytic production of magnesium metal from magnesium chloride and the immediately subsequent reduction of titanium tetrachloride from a source thereof with the electrolytically formed magnesium, the chlorine gas formed as a by-product of the electrolysis being used to chlorinate a mixture of titanium ore and coke to form titanium tetrachloride used for the reduction reaction, the apparatus comprising a single vessel for conducting both the electrolysis and the reduction reaction isolated from exposure to air until the titanium metal sponge formed therein is cooled to a temperature below the reaction temperature of titanium with air, means coupled to said single vessel for feeding titanium tetrachloride thereto from the exterior thereof, container means within said single vessel for holding a molten charge of magnesium chloride, said container means having a perforate floor, anode and cathode electrode means arranged within said single vessel for effecting



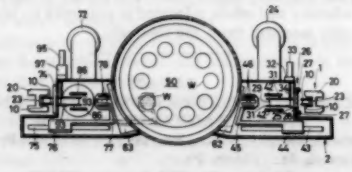
the electrolysis of said magnesium chloride, means terminating the electrolysis when a predetermined quantity of magnesium metal is formed as a floating liquid body on the molten magnesium chloride in the container of the single vessel, one of said anode and cathode electrode means capable of being removed sealably from said vessel interior upon completion of said electrolysis, said feed means removably coupled sealably to said vessel for directing titanium tetrachloride to said single vessel only subsequent to completion of said electrolysis to enable reaction thereof with said floating body of magnesium metal, said single vessel being formed of a pair of sealably coupled superposed coaxially arranged vessel section capable of being separated for gaining access to the titanium metal produced subsequent to cooling thereof and means for lifting said container means from the lower section to at least the vicinity of said upper section when the reduction reaction is completed.

4,487,678

DRY-ETCHING APPARATUS

Minori Noguchi, Yokohama; Toru Otsubo, Fujisawa; Susumu Aiuchi; Takashi Kamimura, both of Yokohama, and Teru Fujii, Chigasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 6, 1984, Ser. No. 597,749
Claims priority, application Japan, Apr. 6, 1983, 58-59232
Int. Cl.³ C23C 15/00
U.S. Cl. 204—298 **2 Claims**



1. In a dry-etching apparatus provided with an etching chamber within which the dry etching of an aluminum wiring film formed on a wafer is performed, a vacuum antechamber in which the degree of vacuum is higher than that in said etching chamber, a gate valve provided in an opening made in a boundary wall between said etching chamber and said antechamber, a dry-etching apparatus characterized in that it is provided with a cassette in said vacuum antechamber which is adapted to hold a wafer in such a manner that the wafer can be inserted thereinto and removed therefrom, a transfer means supporting said cassette and which is adapted to move said cassette reciprocally between a wafer-holding position in which said wafer can be inserted into and removed from said cassette, and an post-treatment position in which the etched wafer is subjected to post-treatment, and a post-treatment chamber provided at said post-treatment position so as to communicate with said vacuum antechamber.

4,487,679

POTASSIUM ION-SELECTIVE ELECTRODE

Daniel R. Stare, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 15, 1984, Ser. No. 589,963
Int. Cl.³ G01N 27/30
U.S. Cl. 204—418 **6 Claims**

1. In a dry-operative potassium ion-selective electrode comprising:

(a) a dried internal reference electrode comprising a metal/-metal salt reference electrode, said reference electrode comprising a conductive layer of a metal in contact with a layer of an insoluble salt of a metal, and a dried electrolyte layer comprising the dried residue of a water soluble salt having, as an anion, the anion of said metal salt layer and a hydrophilic polymeric binder in a solvent for the polymer and salt; and

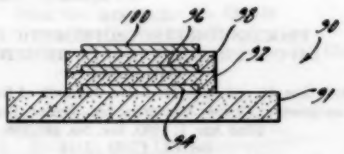
(b) in contact with the reference electrode a hydrophobic ion-selective membrane of predetermined uniform thickness in regions intended for contact with a sample for analysis, said membrane comprising an ion carrier dissolved in a carrier solvent; the improvement comprising a mixture of sodium halide and potassium halide in a weight ratio from 1:1 to 19:1 in said electrolyte layer.

4,487,680

PLANAR ZRO_2 OXYGEN PUMPING SENSOR

Eleftherios M. Logothetis, and William C. Vassell, both of Birmingham, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Apr. 18, 1983, Ser. No. 505,036
Int. Cl.³ G01N 27/46
U.S. Cl. 204—426 **1 Claim**



1. An oxygen pumping device responsive to the oxygen partial pressure in a gas comprising:

a first oxygen ion conductive solid electrolyte material layer of a first porosity;

a second oxygen ion conductive solid electrolyte material layer of a second porosity in contact with said first electrolyte material layer, at least one of said first and second porosities having a permeability to gases;

a first electrode between, and in contact with, said first electrolyte material layer and said second electrolyte material layer,

a second electrode on said first electrolyte material layer;

a third electrode on said second electrolyte material layer;

said first and second electrolyte material layers being a zirconium dioxide material, said first electrolyte material layer having greater porosity than said second electrolyte material layer;

said first electrolyte material layer being generally planar and having said first and second electrodes positioned on opposing sides,

said second electrolyte material being generally planar and extending over said first electrode and said first electrolyte material layer so that said first electrode is substantially encapsulated by said first and second electrolyte material layers;

said third electrode being positioned on the opposing side of said second electrolyte material from said first electrode;

a support layer for mechanically supporting said first and second oxygen ion conductive solid electrolyte material layers, said support layer having a permeability to gases;

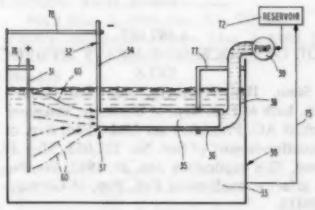
each of said first and second oxygen conductive solid electrolyte material layers being substantially thinner than said support layer; and

said second electrode being formed between said first electrolyte material layer and said support layer.

4,487,681
ELECTROPLATING TEST CELL

Franz R. Cordes, State College, Pa., assignor to Chemcut Corporation, State College, Pa.

Filed Jan. 17, 1983, Ser. No. 458,668
Int. Cl.³ G01N *27/42*
U.S. Cl. 204—434 **10 Claims**



1. An electroplating cell for measuring the throwing power of an acid, comprising:

a container for receiving an electrolyte therein,

an anode in the container with at least a protion of the anode adapted to be disposed in the electrolyte, and another portion of the anode being suitably disposed for electrical connection thereto,

a cathode in the container, with at least a longitudianlly disposed portion of the cathode adapted to be disposed in the electrolyte, and with another portion of the cathode being suitably disposed for electrical connection thereto, and

a longitudinally disposed insulating tube means surrounding at least a major portion of the cathode along substantially its entire length and comprising means facilitating substantially longitudinal flow of current in the electrolyte along the surrounded portion of the cathode, when electrical connection ia made to suitable portions thereof, wherein the tube means is a tube that is open at one end, so as to permit the electrolyte to enter the region between the cathode and the tube, wherein the tube is connected to a pumping means, the pumping means being connected to pump the electrolyte through the tube.

7. A kit for constructing an electroplating test cell for measuring the throwing power of an acid, the kit comprising box means for containing electrodes and electrolyte, the box means comprising means facilitating the attachment of electrodes to be carried by the box means, a first electrode, a second electrode, and a glass tube, shaped to comprise means surrounding a longitudinally disposed portion of the second electrode, and comprising means facilitating substantially longitudinal flow of current in the electrolyte along the surrounded portion of the second electrode, when the electroplating test cell is operating, further comprising pumping means adapted to be connected to the tube.

4,487,682
COAL EXTRACTION

James W. Clarke, Tewkesbury; Geoffrey M. Kimber, and Terry D. Rantell, both of Cheltenham, all of England, assignors to Coal Industry (Patents) Limited, London, England

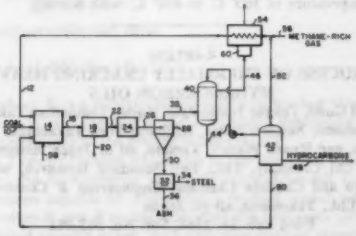
Filed Jun. 23, 1980, Ser. No. 162,128
Claims priority, application United Kingdom, Jul. 17, 1979, 7924935
Int. Cl.³ C10G *1/00*
U.S. Cl. 208—8 LE **3 Claims**

1. In the method of preparing coal extract by hydrogenative extraction using a liquid solvent, the improvement comprising extracting coal at a temperature of from 425° to 470° C. to form a slurry, fractionating the extract to remove low boiling material using a cut point in the range of approximately 250° C. to 300° C. and filtering at a temperature in the range 200° to 300° C. the residue boiling above the cut point so that the filtrate contains less than 0.1% by weight of mineral matter, whereby precipitation of components of the extract is avoided in the slurry to be filtered.

4,487,683
ACETYLENE FROM COAL AND AN ELECTRIC ARC

Carl R. Bozzuto, Enfield, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Jul. 26, 1982, Ser. No. 401,806
Int. Cl.³ C10G *1/00*; C10B *57/16*
U.S. Cl. 208—8 R **9 Claims**



1. A process for producing acetylene from coal and methane-rich gas comprising the steps of:

(a) heating said coal and said methane-rich gas to a peak temperature over 6000° F. in an electric-arc to form a plasma;

(b) cooling the plasma of step (a) to less than 6000 F.;

(c) maintaining the temperature of the cooled plasma at a temperature within the range of 5000 to 6000 F. for approximately 60 milliseconds to form a substantially equilibrated mixture of chemical compounds including said acetylene; and

(d) quickly quenching the compounds following step (c) to a substantially lower temperature in less than 30 milliseconds whereby the chemical activity between the formed compounds is substantially stopped and the chemical composition of the quenched mixture is maintained substantially unchanged.

4,487,684

PROCESS FOR HYDROGENATION OF COAL

Helmut Würfel, Blieskastel, Fed. Rep. of Germany, assignor to Gfk Gesellschaft für Kohleverflüssigung mbH, Saarbruecken, Fed. Rep. of Germany

PCT No. PCT/DE82/00199, § 371 Date Jun. 8, 1983, § 102(e) Date Jun. 8, 1983, PCT Pub. No. WO83/01456, PCT Pub. Date Apr. 28, 1983

PCT Filed Oct. 7, 1982, Ser. No. 511,165

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1981, 3141380

Int. Cl.³ C10G *1/06*

U.S. Cl. 208—10 **7 Claims**

1. An improved process for hydrogenizing coal whereby the finely ground coal is pumped under pressure, heated to the temperature at which hydrogenation is initiated and hydrogenated with hydrogen in a reaction zone in the presence of a substance which acts as a catalyst, the process being such that at least part of the heat required for the heating process is fed to the coal in a mixer by direct heat-exchange with hot product vapors, the improvement characterized in that, in the region of the mixer, the coal slurry is brought into contact with an additional hot stream of gas other than said hot product vapors and is heated by direct heat exchange contact therewith.

4,487,685

METHOD FOR PRODUCING MESOPHASE-CONTAINING PITCH BY USING CARRIER GAS

Masami Watanabe, Tokyo, Japan, assignor to Kashima Oil Company Limited, Chiyodaku, Japan

Filed Jun. 24, 1983, Ser. No. 507,585

Int. Cl.³ C10C *1/00*

U.S. Cl. 208—44 **4 Claims**

1. A method for producing a mesophase-containing pitch from petroleum pitch or coal tar pitch which comprises driving off from said pitch, volatile distillate fractions which are present orignally in the raw material pitch or formed as by-product during heat treatment time, by using as a non-oxidative carrier gas, a lower boiling point naphtha fraction or a dry gas formed during said heat treatment or a mixture of these gases at a temperature of 360° C. to 450° C. with stirring.

4,487,686

PROCESS OF THERMALLY CRACKING HEAVY HYDROCARBON OILS

Shimpei Gomi, Tokyo; Tomio Arai, Zushi; Tomomitsu Takeuchi, Yokohama; Shigeru Miwa, Ichihara; Toru Takatsuka, Yokohama, and Ryuzo Watari, Yamato, all of Japan, assignors to Fuji Oil Company, Ltd.; Fuji Standard Research, both of Tokyo and Chiyoda Chemical Engineering & Construction Co., Ltd., Yokohama, all of, Japan

Filed Feb. 24, 1984, Ser. No. 583,182

Claims priority, application Japan, Feb. 28, 1983, 58-32570

Int. Cl.³ C10G *9/16, 9/14, 51/02*

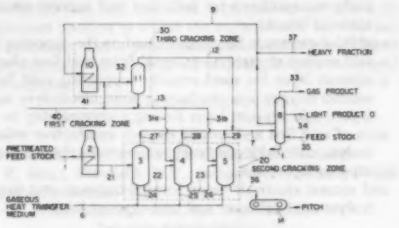
U.S. Cl. 208—48 R **18 Claims**

1. A process of thermally cracking a heavy hydrocarbon oil, comprising the steps of:

(a) feeding the heavy hydrocarbon oil into a first thermal cracking zone for thermally cracking the heavy hydrocarbon oil and for obtaining a first, thermally cracked product;

(b) introducing said first product into a second thermal cracking zone for thermally cracking said first product and for obtaining a second, thermally cracked product and a pitch product, said second cracking zone having a plurality of cracking reactors which are connected in series, through which is successively passed said first product and to each of which is supplied a gaseous heat transfer medium to maintain the liquid phase therein, including said first product, at a temperature sufficient for effecting the thermal cracking and to strip the resulting distillable, cracked components from the liquid phase, the thermal cracking temperature in one reactor being so controlled as to become higher than that in its adjacent upstream-side reactor, the distillable, cracked components in respective reactors being removed overhead therefrom as said second product, the liquid phase in the downstream-end reactor being discharged therefrom for recovery as said pitch product;

(c) separating said second product into a heavy fraction and a light fraction;



(d) recovering said light fraction as a light product oil;

(e) introducing said heavy fraction into a third thermal cracking zone for thermally cracking same and for obtaining a tar-containing product; and

(f) recycling said tar-containing product to at least one of said reactors of said second thermal cracking zone together with a naphthene-based heavy hydrocarbon oil.

4,487,687

METHOD OF PROCESSING HEAVY HYDROCARBON OILS

Thomas Simo, Bad Homburg, and Karl-Heinz Eisenlohr, Dreieich, both of Fed. Rep. of Germany, assignors to Metallgesellschaft AG, Frankfurt am Main, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 151,053, May 19, 1980, abandoned. This application Jan. 25, 1982, Ser. No. 342,315

Claims priority, application Fed. Rep. of Germany, May 19, 1979, 2929415

Int. Cl.³ C10G *49/20, 65/12*

U.S. Cl. 208—56 **3 Claims**

1. A process for converting heavy hydrocarbon oils containing asphaltenes and/or metals to lighter, useful hydrocarbons, comprising:

A. adding finely ground coke to said heavy hydrocarbon oil, said coke serving as a support for asphaltenes and/or metals present in said heavy hydrocaarbon oil;

B. mixing said heavy hydrocarbon oil containing said coke with a donor solvent and with molecular hydrogen and subjecting the mixture to hydrovisbreaking, the amount of coke in said mixture being 1 to 3 percent by weight of the total liquid feed supplied to hydrovisbreaking, the amount of donor solvent being 15 to 35 percent by weight of the heavy hydrocarbon oil of said mixture, said donor solvent containing 20 to 50 percent by weight of naphthenes;

C. in said hydrovisbreaking said mixture being contacted at a temperature of 380° to 450° C. and a pressure of 140 to 175 bars with hydrogen under non-agglomerating conditions; in said hydrovisbreaking liquid hourly space velocity being 0.5 to 2 kg/liter-hour and recycle gas rate being 400 to 2000 standard meters³ per metric ton of the total liquid feed to said hydrovisbreaking;

D. distilling the product of said hydrovisbreaking to remove at least one distillate and to leave behind a residue;

E. feeding a distillate from step D having a boiling range of 200° to 480° C. into a hydrogenation zone containing a hydrogenation catalyst forming a fixed bed, said hydrogenation zone being at a temperature in the range of 360° to 410° C. and at a hydrogen pressure in the range of 130 to 175 bars, the product of said hydrogenation zone being

subjected to stabilizing to remove the C_5-fraction, from the stabilization product removing a gasoline fraction to produce a diesel oil fraction boiling in the range of 220° to 460° C. and mixing at least a portion of said diesel oil fraction with said hydrocarbon oil of step B as the sole donor solvent.

4,487,688

SELECTIVE SORPTION OF LUBRICANTS OF HIGH VISCOSITY INDEX

Ralph M. Dessau, Edison, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 307,050, Sep. 30, 1981, abandoned, which is a continuation-in-part of Ser. No. 105,190, Dec. 19, 1979, Pat. No. 4,309,281. This application Nov. 5, 1982, Ser. No. 439,454

Int. Cl.³ C10G *25/03*

U.S. Cl. 208—310 Z **15 Claims**

1. A process for the selective separation of hydrocarbon lubricant fractions of high viscosity index from a hydrocarbon lubricant base stock, below cracking temperature which comprises contacting the base stock with a crystalline zeolite having a silica:alumina ratio of at least 12:1 and a Constraint Index of 1 to 12, to sorb the high viscosity index fractions of the zeolite.

4,487,689

SYSTEM FOR FILTERING A LIQUID

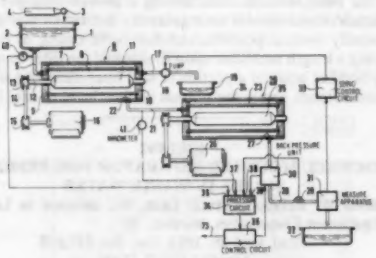
Stanislas Galaj, Arcueil, France, assignor to Compagnie Generale D'Electricite, Paris, France

Filed Mar. 1, 1984, Ser. No. 585,084

Claims priority, application France, Mar. 4, 1983, 83 03553

Int. Cl.³ B01D *13/00, 31/00*

U.S. Cl. 210—108 **8 Claims**



1. A system for filtering particles from a liquid, the system comprising:

(a) a first filter comprising:

an enclosure, a filter chamber within said enclosure partially defined by a wall and having an inlet,

a portion of the wall of said chamber being constituted by a porous member of sintered material having an inside surface facing the inside volume of the chamber and an outside surface facing the other way, the inside and outside surfaces being parallel to each other, the porous member including a membrane one of whose surfaces constitutes said inside surface, the pores in the membrane being smaller than the particles to be filtered from said liquid, each pore being in communication with adjacent pores, and

said enclosure surrounding said outside surface, said enclosure being provided with an outlet opening;

(b) means for inserting the liquid into the chamber via its inlet and at a first constant pressure P_1;

(c) means for impressing a predetermined speed parallel to said inside surface to the liquid contained inside the chamber, a portion of the liquid passing through the porous member and being received in the enclosure;

(d) a pump connected to the outlet opening of said enclosure and to a first tank for removing another portion of the liquid that has circulated inside the chamber;

(e) liquid flow rate measuring apparatus series connected between the outlet opening from the enclosure and a second tank;

(f) a servo-control circuit receiving information concerning the measured flow rate and capable of controlling the pump to maintain a constant predetermined ratio between the measured flow rate and the pump flow rate; and

(g) a controllable liquid back pressure unit connected between the outlet opening of the enclosure and the measuring apparatus for applying, during a predetermined period of time, a second constant liquid pressure P_2 on the outside surface of the porous member, in opposition to the first constant pressure P_1, where P_2 is greater than P_1,

the improvement wherein the system further includes:

(h) a second filter identical to the first filter including an enclosure, a second filter chamber, an inlet to the second filter connected to the outlet opening from the enclosure of an first filter by a first pipe, the outlet from the second filter being closed, the second filter having an outlet opening from the second filter enclosure connected to the flow rate measuring apparatus via the backpressure unit;

(i) means for impressing said predetermined speed parallel to the inside surface of the porous member of the second chamber to the liquid contained therein;

(j) a manometer for measuring the pressure P_3 of the liquid flowing in said first pipe;

(k) means for maintaining the pressure P_4 of the liquid flowing in a second pipe constant when the backpressure unit is not operating, said second pipe connecting the outlet of the backpressure unit to the inlet of the flow rate measuring apparatus;

(l) a processor circuit receiving signals representative of the pressure P_1, P_2, P_3, and P_4, said circuit including means capable of determining firstly the value:

$$A = P_1 - 2P_3 + P_4$$

and secondly the value:

$$B = (K/2N)(P_2 - 2P_1 + P_4),$$

where K is a predetermined safety factor less than unity, and N is a predetermined coefficient depending on the membranes of the porous members; and

(m) a control circuit connected to the processor circuit and to the backpressure unit, said control circuit including means capable of delivering a control signal when the values A and B as determined by the processor circuit are equal to each other, such that said control signal causes said backpressure unit to operate.

4,487,690

SUMP OR FLUSH INSTALLABLE ROOF DRAIN

Duane D. Logsdon, 1708 Calavera Dr., Fullerton, Calif. 92631

Filed Mar. 21, 1983, Ser. No. 476,985

Int. Cl.³ E03F *5/14, 5/06*

U.S. Cl. 210—163 **6 Claims**

1. A roof drain which comprises:

an integrally formed body having a water collecting section, a first body surface, a second body surface and a connecting surface;

said water collecting section located within said body, said collecting section including a generally funnel shaped portion with said funnel shaped portion terminating into a vertically oriented cylindrical section, said cylindrical section forming the lowermost portion of said body with said cylindrical section sized and shaped for joining to a cylindrical pipe;

said first body surface being generally horizontally oriented and extending outwardly and completely surrounding said collecting section;

said second body surface being generally horizontally oriented and positioned outwardly and upwardly from said first body surface and completely surrounding said first body surface with said connecting surface joining said second body surface to said first body surface, said second body surface being parallel to said first body surface;

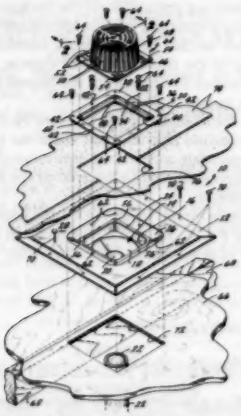
said connecting surface is obliquely oriented with respect to said parallel first and second body surface and extends outwardly from said first body surface to said second body surface;

a self supporting grate member having a peripheral mounting flange and a central foraminous structure completely surrounded by said mounting flange and extending upward from said mounting flange, said foraminous structure serving as a water passageway from the exterior of said grate to the interior of said grate;

said peripheral mounting flange including at least two vertically oriented connecting openings, said peripheral mounting flange sized and shaped so as to be capable of being located against and mating with said first body surface and when mated with said first body surface said peripheral mounting flange positioned inwardly and downwardly from said second body surface and inwardly from said connecting surface;

said first body surface including a plurality of vertically oriented open mouth closed end tube means, said tube means located in said first body surface with said open mouths projecting upwardly and said closed ends located below said open mouths, said tube means positioned on said first body surface such that at least two of said plurality of tube means are located in a vertical alignment with said openings in said peripheral flange of said grate means when said grate means is positioned above said body;

a plurality of connecting member equal in number to the number of said openings in said peripheral flange of said grate means, said connecting members capable of connecting said grate means to said body by passing through said openings in said peripheral flange of said grate means and into and connecting with said tube means in said first body surface of said body.



4,487,691

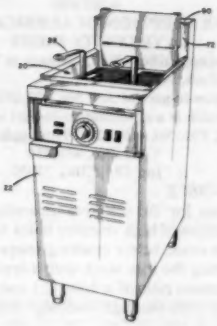
DEEP FAT FRYER WITH SWIVEL FILTER ELEMENT

Robert A. Panora, Milton, Mass., assignor to Thermo Electron Corporation, Waltham, Mass.

Filed Jan. 9, 1984, Ser. No. 569,092

Int. Cl.³ A47J 37/12

U.S. Cl. 210—167 **5 Claims**



1. In a deep fat fryer including a tank for holding cooking fat, a filter for filtering the fat, and circulating means for withdrawing fat from the tank and then returning fat to said tank, the improvement wherein said filter is positioned in the bottom of said tank and includes an outer casing having a plurality of holes for discharge of fat, a filter element within said casing, an inlet for receiving fat to be filtered, and lock means for permitting removal and replacement of said filter element, said circulating means includes a return conduit extending through said tank and connected to the inlet of said filter for delivering fat to the filter, said conduit having a swivel joint permitting rotation of said filter from a generally horizontal position to a generally vertical position, and said outer casing of the filter having a length such that upon rotation of the filter to a generally vertical position a portion of said filter including said lock means extends above the normal surface level of said fat.

4,487,692

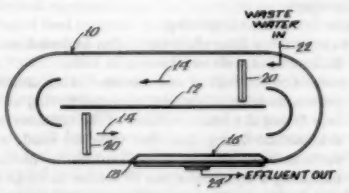
SIDEWALL MOUNTED SEPARATOR FOR REMOVING SOLIDS IN WASTE WATER

William W. Kersten, Crystal Lake, Ill., assignor to Lakeside Equipment Corporation, Bartlett, Ill.

Filed Aug. 29, 1983, Ser. No. 527,015

Int. Cl.³ B01D 21/00

U.S. Cl. 210—194 **11 Claims**



1. A waste water treatment system, comprising:

means defining a vessel having a closed loop flow path for receipt of waste water and at least one wall;

means for introducing waste water to be treated into said vessel;

means for moving waste water along said path;

means for introducing an oxygen containing medium into the waste water in said vessel to promote oxidation of organic solids in said waste water;

a clarifier mounted on said wall and in said vessel within said flow path, said clarifier being sufficiently narrow in relation to said flow path so as to avoid any significant decrease in the cross sectional area thereof to avoid interference with maintenance of a desired velocity of waste water in said path and elongated in the direction of said flow path and having an upper end and a lower end, said upper and lower ends being disposed respectively above and below the intended level of waste water in said vessel, said clarifier having closed side and end walls and having means defining an open lower end such that waste entering said clarifier may enter only through said lower end; and

a plurality of means along the length of said clarifier for withdrawing treated waste water from said upper end, said withdrawing means being constructed and arranged such that the flow of waste water from said lower end to said upper end will be of sufficiently low velocity that any organic solids initially entering said clarifier will exit the same under the influence of gravity through said open lower end.

4,487,693

MULTI-LAYER COIL COUNTERCURRENT CHROMATOGRAPH WITH ADJUSTABLE REVOLUTIONAL RADIUS

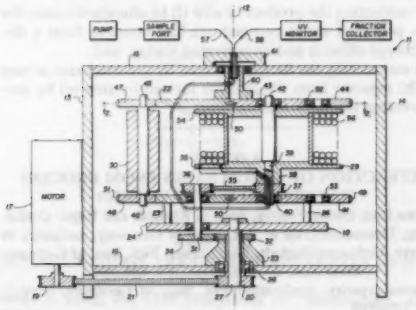
Yoichiro Ito, Bethesda, Md., assignor to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Continuation-in-part of Ser. No. 416,107, Sep. 9, 1982,. This application Nov. 23, 1983, Ser. No. 554,795

The portion of the term of this patent subsequent to May 18, 1999, has been disclaimed.

Int. Cl.³ B01D *15/08*

U.S. Cl. 210—198.2 **12 Claims**



1. An apparatus for continuous countercurrent chromatography comprising a support, frame means rotatably mounted on said support for rotation on a first axis, multi-layer helically coiled separation column means having opposite axial end portions and being rotatably mounted on said frame means for rotation on a second axis parallel to and spaced from said first axis, inlet and outlet flow tubes connected to the terminal ends of said multi-layer helically coiled column means, means to simultaneously revolve said frame means around said first axis and rotate said column means around said second axis, and means carried by said frame means enabling changing the spacing distance between said second axis and said first axis.

4,487,694

DEVICE FOR REMOVING IMPURITIES FROM THE SURFACE OF LIQUIDS

Manfred Brandt, and Viktor Kurmis, both of Bremen, Fed. Rep. of Germany, assignors to ERNO Raumfahrttechnik GmbH, Bremen, Fed. Rep. of Germany

Filed Oct. 7, 1980, Ser. No. 194,836

Claims priority, application Fed. Rep. of Germany, Oct. 11, 1979, 2941187

Int. Cl.³ E02B *15/04*

U.S. Cl. 210—242.3 **7 Claims**

1. Device for the removal of contaminants on the surface of liquids, such as hydrocarbons on water surfaces; comprising:

a floatable container having an open front and provided for moving or being moved through the liquid at the surface thereof, the container having side walls and a bottom, the bottom having a portion upwardly inclined toward the open front, the container provided for flowthrough of the liquid with a free surface;

a shear flag having a sharp front edge;

hinge means for mounting the flag with its edge facing toward the open front;

floating means affixed to the flag and extending forward thereof, toward the oncoming flow of liquids for floating on the liquid surface and determining thereby the pivotable disposition of the flap so that the sharp edge is held in about an interface between the contaminant and the liquid;

an extension on the flap, extending rearward from said pivot axis to provide for stabilization of the flap; and

means for steadying flow of liquid over the shear flap, being disposed downstream from the shear flap and in approximately a level of said hinge means.

4,487,695

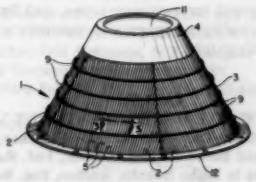
CENTRIFUGE SCREEN BASKET

James D. Connolly, P.O. Box 1238, Princeton, W. Va. 24740

Filed Dec. 27, 1983, Ser. No. 565,371

Int. Cl.³ B01D *21/26*; B07B *1/12*

U.S. Cl. 210—380.1 **5 Claims**



1. A screen basket rotatably mountable in a centrifuge for deliquefying and/or classifying material, comprising a screening area formed by a plurality of laterally spaced longitudinally extending screen wires exteriorly backed and connected by longitudinally spaced circumferential tie bands welded to backs thereof, said screen wires forming by inner faces thereof an internal screening surface of said screening area, and said inner faces being so disposed and configured as on initial installation of said basket to present to material fed into said basket longitudinally extending serrations operative on rotation of said basket to drivingly engage said material.

4,487,696

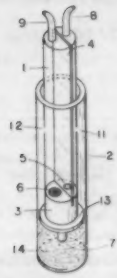
BLOOD SEPARATOR AND DISPENSER

Louis T. Ferrara, 2988 Ave. T, Brooklyn, N.Y. 11229

Filed Aug. 14, 1978, Ser. No. 915,530

Int. Cl.[2] B01D *33/22*

U.S. Cl. 210—399 6 Claims



1. A blood separating device adapted for use with a blood centrifuge tube, said blood separating device comprising:

an elongated tubular member of an outer diameter less than the inner diameter of said blood centrifuge tube, Partitioning means to longitudinally partition said elongated tubular member into a first compartment means and a second compartment means; said first compartment means being substantially larger than said second compartment means,

first vent means communicating with said first compartment means for venting air therefrom,

second vent means communicating with said second compartment means, for venting air therefrom,

first dispensing means communicating with said first compartment means at the first end of said elongated tubular member, for dispensing drops from said first compartment means,

second dispensing means communicating with said second compartment means at the first end of said elongated tubular member, for dispensing drops from said second compartment means; said first and second dispensing means being so designed to enable dispensing from only one of said first and second compartment means at a time,

resilient element means fitted in sealing relationship with the second end of said elongate tubular member and said partitioning means, said resilient element means further comprising first filter means communicating with said first compartment means, second filter means communicating with said second compartment means, and flange means designed to sealingly engage with the inner wall of said blood centrifuge tube.

4,487,697

BIOLOGICAL WASTE-WATER-TREATMENT METHOD

Botho Böhnke, Maria-Ther.-Allee 231, D-51 Aachen, Fed. Rep. of Germany, and Bernd Diering, Aachen, Fed. Rep. of Germany, assignors to Botho Böhnke, Aachen, Fed. Rep. of Germany

Continuation of Ser. No. 411,108, Aug. 24, 1982, abandoned, which is a continuation-in-part of Ser. No. 301,034, Sep. 10, 1981, abandoned, which is a continuation-in-part of Ser. No. 265,585, May 20, 1981, abandoned, which is a continuation of Ser. No. 125,782, Feb. 29, 1980, abandoned. This application Dec. 16, 1983, Ser. No. 562,998

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1979, 2908134

Int. Cl.[3] C02F *3/04, 3/30*

U.S. Cl. 210—605 2 Claims

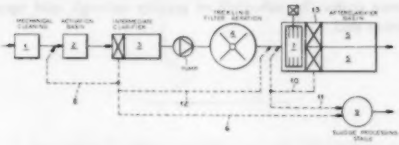
1. A method of treating waste water in the form of communal or industrial waste water containing a significant amount of difficult-to-decompose organic compounds, which comprises the steps of:

(a) mechanically removing impurities from the waste water to preclean same;

(b) biodegrading the precleaned waste water by treatment in a facultative anaerobic mode with an oxygen content of about zero mg/liter in the presence of procaryotic cells to form a partially cleaned waste water and sludge as a product with adsorption by the sludge of fragments of difficult-to-decompose compounds cracked in the treatment;

(c) subjecting the product of step (b) to intermediate clarification to separate an active sludge from an effluent, recycling a portion of said active sludge to step (b) and generating surplus sludge;

(d) maintaining the sludge age in step (b) between 2 and 10 hours by controlling the rate at which said product is withdrawn from step (b) and the rate at which said active sludge is partially recycled from step (c) to step (b);



(e) subjecting the effluent of step (c) to aeration with aerobic decomposition of residual fragments of said difficult-to-decompose compounds and nitrification in a trickling filter to produce a further sludge and effluent in the product of the trickling filter, the oxygen concentration in said trickling filter being such that the oxygen content of the outlet thereof is greater than 2 mg/liter;

(f) combining the product of step (e) in a mixing stage with surplus sludge derived at least in part from step (c), agitating and flocculating sludges in said mixing stage, and subjecting the mixture to facultative anaerobic decomposition with an oxygen content of about zero mg/liter and simultaneous denitrification for a period of about half an hour;

(g) subjecting the product of step (f) to afterclarification for a period of about two-and-one-half hours to form a discharge effluent and an activated sludge; and

(h) maintaining the biozone formed by the treatment of step (b) separate from the biozone formed by step (e) by preventing feedback therebetween.

4,487,698

EXTRACTION OF ONIUM SALTS FROM PROCESS WATERS AND WASTE WATERS

Karsten Idel; Dieter Freitag, both of Krefeld, and Edgar Ostlinning, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 20, 1983, Ser. No. 486,884

Claims priority, application Fed. Rep. of Germany, May 3, 1982, 3216383

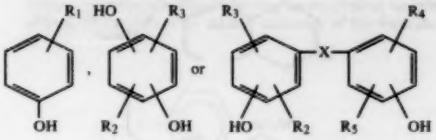
Int. Cl.[3] C02F *1/26*

U.S. Cl. 210—639 5 Claims

1. A process for removing onium salts from aqueous solutions comprising the steps of adding a phenolic compound to an onium salt containing aqueous solution, contacting the solution with a water-immiscible organic material to produce an aqueous phase and an organic phase whereby the onium salt migrates from the aqueous phase into the water-immiscible organic material, wherein the aqueous solution has a pH of 6 to 14, the molar ratio of onium salt to added phenolic compound is from 1:1 to 1:100, and the volume ratio of water iamisible organic phase to aqueous solution is about 1:25 to 10:1, and

separating the aqueous phase from the water-immiscible organic material containing onium salt,

wherein said phenolic compound is a triphenol, tetraphenol or a polyphenol or is a phenol of the formula



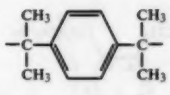
wherein

R_1 is meta or para to the -OH and is alkyl or cycloalkyl having 1 to 18 carbon atoms, aryl having 6 to 24 carbon atoms, alkaryl having 6 to 24 carbon atoms or aralkyl having 6 to 24 carbon atoms and is unsubstituted or substituted by halogen and can also include an ether, thioether, keto or epoxy moiety;

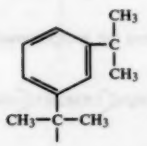
R_2, R_3, R_4 and R_5 are the same or different and each represents hydrogen, alkyl or cycloalkyl having 1 to 12 carbon atoms either unsubstituted or substituted by halogen; and

X is a direct bond, alkylene or cycloalkylene having 2–18 carbon atoms, alkylidene or cycloalkylidene having 1–18 carbon atoms, a heterocyclic moiety which can be condensed to the aromatic nuclei, a bicyclic ring system,

—O—, —S—, —SO—, —SO_2—, or a moiety of the formula



or



4,487,699

SEWAGE SLUDGE TREATMENT APPARATUS AND PROCESS

Charles A. Long, Jr., 4144 Sharpsburg Dr., Birmingham, Ala. 35213

Filed Dec. 9, 1983, Ser. No. 560,058
Int. Cl.³ C02F 1/78
U.S. Cl. 210—760 **46 Claims**

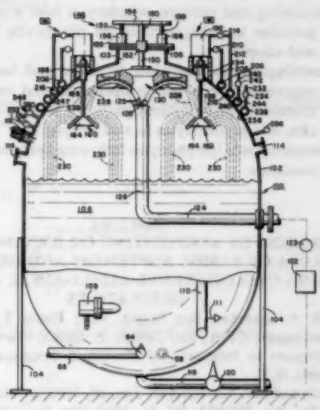
1. Apparatus for use in a sewage sludge treatment system comprising

a vessel including sludge inlet means for conveying sludge to the vessel to be accumulated in a lower portion of the vessel, a sludge delivery means having a discharge end for delivering the sludge from the lower portion to an upper portion of the vessel, oxygen inlet means for delivering oxygen to the upper portion of the vessel, sludge outlet means for removing sludge from the lower portion of the vessel, and gas outlet means for removing gas from the upper portion of the vessel,

first and second sludge dispersing means within the upper portion of the vessel,

the first sludge dispersing means being generally axially aligned with the discharge end of the sludge inlet means, the first sludge dispersing means including channelling means for channelling a major portion of the sludge from the sludge inlet means toward the second sludge dispersing means,

the second sludge dispersing means being rotatable and being located within the upper portion of the vessel and oriented with respect to the first sludge dispersing means



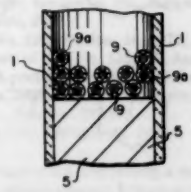
so that a major portion of the sludge being channelled from the first sludge dispersing means impacts upon an impact surface of the second sludge dispersing means, the impact surface of the second sludge dispersing means including a plurality of sludge comminuting and dispersing vanes for dividing the sludge into fine particles and dispersing the sludge particles within the upper portion of the vessel to become oxygenated as they interact with oxygen in the upper portion of the vessel, the oxygenated particles falling to and being collected in the lower portion of the vessel.

4,487,700

METHOD AND APPARATUS FOR SEPARATING LYMPHOCYTES FROM ANTICOAGULATED BLOOD

Robert J. Kanter, Old Bethpage, N.Y., assignor to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed Feb. 18, 1983, Ser. No. 467,640
Int. Cl.³ B01D 21/26
U.S. Cl. 210—789 **20 Claims**



1. A method for separating lymphocytes from other leukocytes in an anticoagulated blood samples, comprising:

introducing a hydrophobic, chemically inert barrier material

into an open-ended container, so as to be located at the bottom of said container;

introducing phagocytizable inert particles into said container over said barrier material, said barrier material having a specific gravity greater than said lymphocytes but less than the specific gravity of said particles and of erythrocytes in said blood sample;

wetting said particles with a hydrophilic material, such that said particles remain over and do not intermix with said barrier material;

introducing said blood sample into said container to mix with said particles;

incubating said mixture, whereby at least a portion of said particles are phagocytized by phagocytic leukocytes in said sample;

centrifuging said container to cause said barrier layer to migrate between said lymphocytes and said leukocytes containing phagocytized particles, unphagocytized particles, and erythrocytes in said sample; and

harvesting said lymphocytes following centrifugation of said container.

4,487,701

PROCESS OF AUGMENTING OR ENHANCING THE AROMA OF FABRIC SOFTENERS AND DETERGENTS USING CYCLOHEXENYL-ALPHA-ALKYL ACROLEIN DERIVATIVES

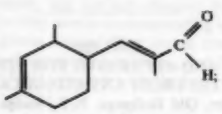
Mark A. Sprecker, Sea Bright, N.J.; Philip T. Klemarczyk, Newington, Conn., and Robert P. Belko, Woodbridge, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

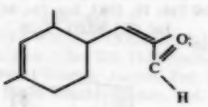
Division of Ser. No. 505,423, Jun. 16, 1983, , which is a division of Ser. No. 398,953, Jul. 16, 1982, Pat. No. 4,424,379. This application May 11, 1984, Ser. No. 609,350

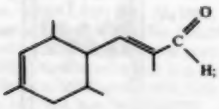
Int. Cl.[3] **C11D** *3/50*

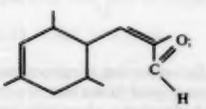
U.S. Cl. 252—8.6 **11 Claims**

1. A process for augmenting or enhancing the aroma of a perfumed article selected from the group consisting of solid or liquid anionic, cationic, nonionic or zwitterionic detergents, fabric softener compositions and fabric softener articles comprising the step of adding to said consumable material, an aroma augmenting or enhancing quantity of at least one aldehyde selected from the group consisting of aldehydes having the structures:









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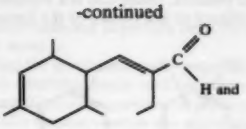
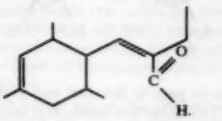




4,487,702

SUBSTITUTED HETEROCYCLIC METHANE SULFONATES AS SACRIFICIAL AGENTS IN ENHANCED OIL RECOVERY

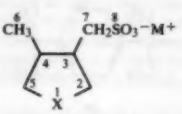
Kirk D. Schmitt, Pennington, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 30, 1982, Ser. No. 373,552

Int. Cl.[3] **E21B** *43/22*

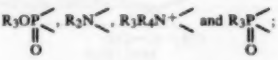
U.S. Cl. 252—8.55 D **17 Claims**

1. A method for the recovery of oil from a subterranean oil reservoir penetrated by spaced apart injection system and production system in which an aqueous surfactant fluid is injected into the reservoir via the injection system to displace oil to the production system, said method comprising injecting into said reservoir an aqueous fluid comprising dissolved sacrificial agent in an amount sufficient to decrease the retention of surfactant in said reservoir, said sacrificial agent being a compound according to the formula



where:

(i) X is selected from the group consisting of O, S,



(ii) M is selected from the group consisting of Na, K, Li and NH_4; and

(iii) R_2 is selected from the group consisting of hydrogen, methyl, ethyl, n-propyl and i-propyl; and

(iv) R_3 and R_4 are the same or different and are selected from the group consisting of methyl, ethyl, n-propyl, and i-propyl, provided that M is absent when X is $R_3R_4N^+$.

4,487,703

SURFACTANT AND PROCESS FOR ENHANCED OIL RECOVERY

Paul R. Stapp, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

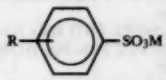
Filed Mar. 23, 1983, Ser. No. 478,189

Int. Cl.[3] **C09K** *3/00;* **E21B** *43/22*

U.S. Cl. 252—8.55 D **10 Claims**

5. In a process for the recovery of oil from a subterranean formation which comprises injecting a surfactant system into the formation via one or more injection wells, the improvement which comprises utilizing a surfactant system consisting essentially of:

(a) 100 parts by weight of water;
(b) 0.1–10 parts by weight of sodium chloride;
(c) 0.1–15 parts by weight of a surfactant composition made by the process comprising reacting maleic anhydride with either a petroleum sulfonate having an equivalent weight of from 275 to 600 or an alkaryl sulfonate of the formula:



wherein R is a C_8 to C_{20} alkyl radical and M is ammonium or an alkali metal at a temperature of from about 50° C. to 250° C. for about 2 hours to 100 hours.

4,487,704

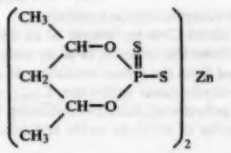
LUBRICATING OIL COMPOSITIONS CONTAINING AN OVERBASED CALCIUM SULFONATE AND A ZINC CYCLIC HYDROCARBYL DITHIOPHOSPHATE-SUCCINIMIDE COMPLEX

Elaine S. Yamaguchi, El Cerrito, and Thomas V. Liston, San Rafael, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

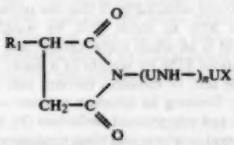
Filed Nov. 22, 1982, Ser. No. 443,362
The portion of the term of this patent subsequent to Apr. 17, 2001, has been disclaimed.
Int. Cl.³ C10M *1/48*
U.S. Cl. 252—33.4 **7 Claims**

1. In a lubricating oil composition containing an overbased calcium hydrocarbyl sulfonate, the improvement wherein said lubricating oil composition additionally comprises an effective amount to reduce wear of an oil soluble complex prepared by reacting at about 25° C. to 180° C.;

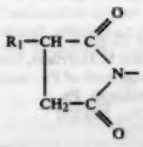
(a) an zinc salt of a cyclic hydrocarbyl dithiophosphoric acid of the formula



(b) an oil soluble alkenyl or alkyl mono- or bis-succinimide of the formula



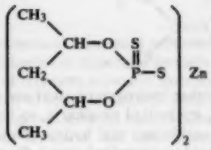
wherein X is amino or a group of the formula



R_1 is an alkenyl or alkyl group containing from about 20 to 300 carbon atoms, U is alkylene containing 2 to 6 carbon atoms, n is an integer of from 0 to 6; wherein the weight ratio of (b) to (a) is at least in the range of from 3:1 to 25:1.

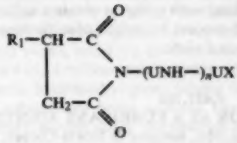
5. A composition comprising a combination of (1) a complex prepared by reacting at about 25° C. to 180° C.;

(a) a zinc salt of a cyclic hydrocarbyl dithiophosphoric acid of the formula

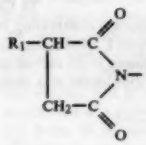


with

(b) an oil soluble alkenyl or alkyl mono- or bis-succinimide of the formula



wherein X is amino or a group of the formula



R_1 is an alkenyl or alkyl group containing from about 20 to 300 carbon atoms, U is alkylene containing 2 to 6 carbon atoms, n is an integer of from 0 to 6, wherein the weight of ratio of (b) to (a) is at least in the range of from 3:1 to 25:1; and

(c) an overbased calcium hydrocarbyl sulfonate, wherein the weight ratio of the complex of component (1) and the overbased calcium salt of component (2) is in the range sufficient to supply from 0.05 to 10% by weight of component (1) and from 0.05 to 5% by weight of component (2) when the additive combination is dissolved in an oil of lubricating viscosity.

4,487,705

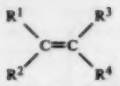
OIL CONTAINING A COSULFURIZED OLEFIN-TRIGLYCERIDE BLEND

Alexander D. Recchuite, Boothwyn, Pa., assignor to Sun Ventures, Inc., St. Davids, Pa.

Division of Ser. No. 220,399, Jan. 24, 1972, , which is a continuation-in-part of Ser. No. 135,466, Apr. 19, 1971, abandoned, which is a continuation-in-part of Ser. No. 116,985, Feb. 19, 1971, Pat. No. 3,825,495. This application Sep. 14, 1973, Ser. No. 397,473
Int. Cl.³ C10M *1/48, 1/38*
U.S. Cl. 252—46.6 **9 Claims**

1. A lubricating composition comprising a major amount of lubricating oil and a minor amount, effective to improve extreme pressure or "slip" properties, of a sulfurized composition of matter prepared by blending together a triglyceride wherein the fatty acid moieties of said triglyceride contain principally from 9 to 22 carbon atoms and at least about 45 mole percent

of the fatty acid moieties present in said triglyceride contain at least one ethylenically unsaturated carbon-carbon double bond and wherein said fatty acid moieties are hydrocarbons except for the carboxyl group of said fatty acid moieties, with an olefinic hydrocarbon containing from 2 to about 24 carbon atoms and having the structure



wherein R^1, R^2 and R^3 are either hydrogen or alkyl and R^4 is either hydrogen, alkyl, aryl, cycloalkyl or alkaryl, to form a blend comprising said triglyceride and said hydrocarbon, the ratio of said hydrocarbon to said triglyceride being in the range from about 50 parts by volume of said hydrocarbon per 50 parts by volume of triglyceride to about 10 parts by volume of said hydrocarbon per 90 parts of triglyceride, and additionally comprising free fatty acids in amount from 2 to 20 weight percent based upon the total of triglyceride and free fatty acids, and reacting the blend with sulfur to obtain a sulfurized blend containing 7.5 to 25 percent by weight of sulfur based on the blend of triglyceride and olefin.

4,487,706

METAL DEACTIVATOR AS A LUBRICANT ADDITIVE

William Y. Lam, St. Louis, Mo., assignor to Edwin Cooper, Inc., St. Louis, Mo.

Filed Feb. 15, 1983, Ser. No. 466,529
Int. Cl.[3] C10M *1/38*
U.S. Cl. 252—47 18 Claims

1. A metal deactivator made by a process comprising reacting (a) about one mole of 2,5-dimercapto-1,3,4-thiadiazole, (b) about 0.9–2.5 moles of an olefin containing 6–30 carbon atoms and (c) about 0.9–2.5 moles of sulfur dichloride at a temperature of about 30° C. to reflux.

4,487,707

REFRIGERATION LEAK SEALANT AND METHOD

Robert H. Holzknecht, 234 King St., Cocoa, Fla. 32922

Filed Sep. 16, 1983, Ser. No. 532,747
Int. Cl.[3] C09K *3/12*; F25B *43/00*
U.S. Cl. 252—68 11 Claims

1. A stop leak composition for stopping a leak in refrigeration systems having a refrigerant comprising:

mineral oil compatible with the refrigerant; and

a mixture of smooth surfaced particles having sizes small relative to the size of the leak, said mixture suspended in said mineral oil wherein the ratio of said particles selected from the group consisting of graphite, polytetrafluoroethylene, magnesium, aluminum sulfate, zinc oxide and mixtures thereof to said mineral oil is within the ratio of about 1:10 to 6:10.

4,487,708

HYDROQUINONE OXYGEN SCAVENGER FOR USE IN AQUEOUS MEDIUMS

John A. Muccitelli, Feasterville, Pa., assignor to Betz Laboratories, Inc., Trevose, Pa.

Continuation of Ser. No. 168,983, Jul. 14, 1980, Pat. No. 4,279,767. This application Mar. 12, 1981, Ser. No. 243,107
The portion of the term of this patent subsequent to Jul. 21, 1998, has been disclaimed.
Int. Cl.[3] C02F *1/20, 1/58*; C09K *15/08, 15/20*
U.S. Cl. 252—178 9 Claims

1. A method for reducing the amount of oxygen in an oxygen-containing aqueous medium which method comprises adding to the aqueous medium an effective amount for the purpose of a hydrazine-free treatment consisting essentially of a stable solution of hydroquinone and mu-amine.

4. A method according to claim 1, wherein the ratio of hydroquinone to mu-amine is about 1:1.3 or less.

4,487,709

PROCESS FOR PRODUCING ELECTRICALLY CONDUCTIVE HIGH POLYMER OF ACETYLENE

Yukio Kobayashi; Hideki Shirakawa, both of Yokohama, and Sakuji Ikeda, Tokyo, all of Japan, assignors to Showa Denko K.K., Tokyo, Japan

PCT No. PCT/JP80/00052, § 371 Date Nov. 29, 1980, § 102(e) Date Nov. 26, 1980, PCT Pub. No. WO80/02146, PCT Pub. Date Oct. 16, 1980
PCT Filed Mar. 28, 1980, Ser. No. 224,518
Claims priority, application Japan, Mar. 29, 1979, 54-36284; Mar. 29, 1979, 54-36285; Mar. 29, 1979, 54-36286; Mar. 29, 1979, 54-36287; Apr. 24, 1979, 54-49734; Apr. 25, 1979, 54-50245
Int. Cl.[3] H01B *1/00*
U.S. Cl. 252—500 2 Claims

1. A process for producing an electrically conductive acetylene high polymer, which comprises doping an acetylene high polymer having a fibrous microcrystalline structure with at most 300 parts by weight of an inorganic protonic acid per 100 parts by weight of the polymer, said inorganic protonic acid being selected from the group consisting of nitric acid, fuming nitric acid, sulfuric acid, fuming sulfuric acid and a superstrong acid of the formula R—SO_3H, wherein R represents Cl, F or a halogen-substituted hydrocarbon group having not more than 5 carbon atoms.

4,487,710

GRANULAR DETERGENTS CONTAINING ANIONIC SURFACTANT AND ETHOXYLATED SURFACTANT SOLUBILITY AID

George J. Kaminsky, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 1, 1982, Ser. No. 353,756
Int. Cl.[3] C11D *1/18*
U.S. Cl. 252—546 5 Claims

1. A granular detergent composition comprising:

(a) from about 12% to about 20% by weight of an anionic surfactant containing from 0% to about 50% by weight of ethylene oxide selected from the group consisting of alkali metal salts of C_{11-13} alkylbenzene sulfonates, C_{14-18} alkyl sulfates, C_{14-18} alkyl polyethoxy sulfates containing from about 1 to about 4 moles of ethylene oxide and mixtures thereof;

(b) from about 5% to about 25% by weight of the anionic surfactant (a) of anionic surfactants of the formula $R(OC_2H_4)_nOSO_3^-M^+$ wherein R is an alkyl group containing from about 10 to about 18 carbon atoms, n is from about 15 to about 100 and selected such that the surfactant contains from about 50% to about 95% by weight of ethylene oxide, and M is an alkali metal cation; and

(c) from about 5% to about 85% by weight of a water-soluble neutral or alkaline salt, or mixtures thereof; said composition prepared by forming an intimate mixture of the anionic surfactant (a) and ethoxylated surfactant (b), forming a sticky paste of said mixture, and then agglomerating said mixture with the water-soluble neutral or alkaline salt.

4,487,711

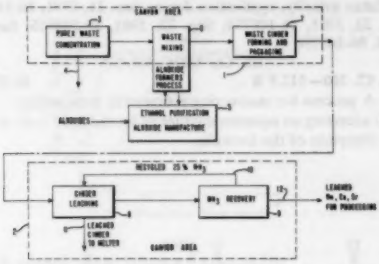
CINDER AGGREGATE FROM PUREX WASTE

James M. Pope, Orchard Park, N.Y.; Don E. Harrison, Murrysville, and Edward J. Lahoda, Edgewood, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 29, 1982, Ser. No. 393,270
Int. Cl.[3] G21F *9/16*
U.S. Cl. 252—629 8 Claims

1. A process for making a cinder aggregate from neutralized PUREX waste comprising:

(A) concentrating said PUREX waste to about 30 to about 40 percent solids;
(B) adding to said concentrated PUREX waste a colloid of such de-alcoholated alkoxides of silicon, boron, and aluminum as is necessary to produce a mixture containing
(1) about 0.001 to about 1 percent aluminum hydroxide;
(2) about 5 to about 15 percent silica; and



(3) about 1 to about 3 percent boric oxide;
(C) heating said mixture to about 400° to about 700° C. to produce said cinder aggregate;
(D) containing and transporting said cinder aggregate; and
(E) disintegrating said cinder aggregate in ammonium hydroxide.

4,487,712

GELATION STABILIZED WATER-SOLUBLE SILICATES

Joe C. Wilson, Woodhaven, and Pauls Davis, Gibraltar, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed May 25, 1983, Ser. No. 498,147
Int. Cl.³ C09K *5/00*; C23F *11/00*; C22F *11/12*
U.S. Cl. 252—78.3 **11 Claims**

1. A gelation-resistant composition comprising a major amount of an alcohol, a corrosion inhibiting amount of at least one water-soluble silicate represented by the formula:

$$[X_{1/d}O-]_e-SiO_{\frac{4-e}{2}}$$

wherein X is a cation that forms a water-soluble silicate, d is the valence of the cation represented by X and has a value of at least one, and e has a value of 1 to 3 inclusive; and an effective silicate gelation stabilizing amount of a gelation inhibitor selected from the group consisting of at least one of a polymer of acrylic acid and the alkali metal and alkaline earth metal salts thereof; at least one of a sugar alcohol; at least one of a water-soluble salt of an acid selected from the group consisting of, tungstic and selenic acids; and mixtures thereof.

4,487,713

PRODUCTION OF ISOCYANATES FROM ESTERS OF AROMATIC CARBAMIC ACIDS (URETHANES)

Ralph J. Spohn, Woodcliff Lake, N.J., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation-in-part of Ser. No. 277,733, Jun. 26, 1981, abandoned, which is a continuation of Ser. No. 179,064, Aug. 18, 1980, abandoned. This application Jan. 28, 1982, Ser. No. 343,584
Int. Cl.³ C07C *118/00*
U.S. Cl. 260—453 P **10 Claims**

1. A process for producing at least one aromatic isocyanate from at least one aromatic carbamate represented by the structural formula selected from the group consisting of:

$$R_1+NHCOOR_2)_n \qquad (I)$$

-continued

and

$$(X+_{n'}+Ar)-R_1+\left[+Ar+R_1+\underset{(X)_{n'}}{|}\right]_{n''}+Ar+(X)_{n'} \qquad (II)$$

said structural formula II representing a mixture of carbamates and wherein in structural formula I: R_1 is a monovalent, divalent, or trivalent aromatic hydrocarbyl group containing from about 6 to about 32 carbon atoms; R_2 is a monovalent hydrocarbyl group selected from saturated-aliphatic, saturated-alicyclic, or aromatic, said hydrocarbyl group having not greater than about 10 carbon atoms; and n is a number of from 1 to 3 corresponding to the valency of R_1; and wherein in structural formula II: X is the monovalent group $—NHCOOR_2$ with R_2 being as defined in connection with structural formula I; R_3 is independently selected from the group consisting of (a) a divalent straight or branched chain saturated aliphatic group having from about 1 to about 10 carbon atoms, (b) a divalent saturated alicyclic group having from about 4 to about 10 carbon atoms, and (c) a divalent aromatic group having from about 6 to 14 carbon atoms; Ar is a substituted or unsubstituted aromatic hydrocarbyl group having from 6 to 14 carbon atoms, said substituents being selected from halogen, $—NH_2$, and mixtures thereof; and n'' is a number, the number average value of which in said mixture can vary from about 2.0 to about 3.5, and n' is a number of from about 1 to about 4; which comprises:
(i) heating in the liquid phase at least one of said carbamates in the presence of a catalyst comprising at least one metal containing polar compound said metal being selected from the group consisting of Ti, Sn, Sb, Zr and mixtures thereof, under conditions and in a manner sufficient to convert by thermolysis said carbamate to at least one isocyanate, and at least one alcohol, said heating being conducted at a pressure of at least atmospheric and varying from 14 to about 200 psia, and said catalyst being effective to accelerate the thermolysis reaction rate relative to the thermolysis reaction rate in the absence of said catalyst, said heating being conducted at a temperature of from 80° to 150° C.; and
(ii) separating said alcohol from said isocyanate and recovering the isocyanate.

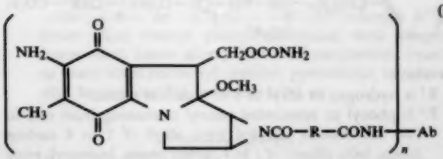
4,487,714

CYTOCIDAL MODIFIED IMMUNOGLOBULIN AND PROCESS FOR THE PREPARATION THEREOF

Yoshinori Kato; Naoji Umemoto, both of Hino; Yumiko Takeda, Higashimurayama, and Takeshi Hara, Hachioji, all of Japan, assignors to Teijin Limited, Osaka, Japan

Filed Jan. 18, 1984, Ser. No. 571,898
Claims priority, application Japan, Jan. 19, 1983, 58-5807
Int. Cl.³ C07G *7/00*; C07C *103/52*; A61K *39/44, 39/395*
U.S. Cl. 260—112 B **4 Claims**

1. A cytocidal modified immunoglobulin expressed by formula (I)



(wherein
Ab represents an immunoglobulin or its fragments;
R represents a divalent organic group; and
n is an integer from 1 to 20).

4,487,715
METHOD OF CONJUGATING OLIGOPEPTIDES

Danute E. Nitecki, San Francisco, and Pradip K. Bhatnagar, Santa Clara, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Jul. 9, 1982, Ser. No. 396,578
Int. Cl.³ C07C *103/52*; C08L *89/00*
U.S. Cl. 260—112.5 R **2 Claims**

1. An improved method for preparing a polypeptide product capable of forming a peptide bond in an aqueous medium, said method being of the type wherein an oligopeptide is formed by the sequential addition of amino acids to an initial amino acid which is bound to a 4-alkoxybenzyl alcohol resin or chloromethyl resin through an ester linkage, said improvement comprising:

reacting a cyclic carboxylic acid anhydride with an available amino group on the oligopeptide to form an amic acid to provide a single free reactive carboxyl group on said oligopeptide;

esterifying said carboxyl group with an hydroxyl compound selected from the group consisting of 4-hydroxy-3-nitrobenezesulfonic acid salt, pentachlorophenol, N-hydroxy succinimide, and p-nitrophenol to provide an activated ester stable to cleavage of the oligopeptide from the resin and capable of forming a peptide bond in an aqueous medium;

cleaving said oligopeptide from said resin employing hydrofluoric acid or trifluoroacetic acid in an inert organic solvent to provide a mixture of said resin and said oligopeptide in an acid solution;

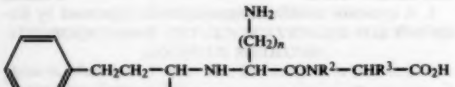
neutralizing said acid solution to a mildly basic pH in the absence or presence of a peptide having an available amino group, whereby said oligopeptide reacts either (1) intramolecularly or intermolecularly with itself or (2) with said amino containing peptide to form a peptide bond.

4,487,716
N-(1-CARBOXY-3-PHENYLPROPYL)-DIPEPTIDES

Dimitrios Sarantakis, West Chester, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Aug. 23, 1982, Ser. No. 410,665
Int. Cl.³ C07C *103/52*
U.S. Cl. 260—112.5 R **5 Claims**

1. A compound of the formula:



in which

R^1 is hydrogen or alkyl of 1 to 4 carbon atoms;

R^2 is phenyl or substituted phenyl containing from one to two substituents selected from alkyl of 1 to 4 carbon atoms, halo, alkoxy of 1 to 4 carbon atoms, hydroxyl, nitro or amino;

R^3 is hydrogen or alkyl of 1 to 4 carbon atoms;

and

n is the integer 4; or a pharmaceutically acceptable salt thereof.

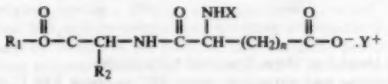
4,487,717
PROCESS FOR RECOVERING A DIPEPTIDE DERIVATIVE

Kiyotaka Oyama, Shin-nanyo; Shigeaki Irino, Tokuyama, and Norio Hagi, Shin-nanyo, all of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shin-nanyo and Sagami Chemical Research Center, Tokyo, both of, Japan

Filed Sep. 8, 1982, Ser. No. 415,912
Claims priority, application Japan, Sep. 21, 1981, 56-147974; Sep. 22, 1981, 56-148754; Sep. 22, 1981, 56-148755; Sep. 22, 1981, 56-148756
Int. Cl.³ C07C *103/52*
U.S. Cl. 260—112.5 R **34 Claims**

1. A process for recovering a dipeptide comprising:

(a) admixing an aqueous mixture of a solid L-L, L-D or D-L dipeptide of the formula:



(I)

wherein

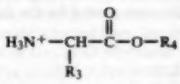
R_1 is a lower alkyl group;

R_2 is a side chain group of an amino acid selected from the group consisting of lower alkyl group and a benzyl group which may be further substituted with hydroxyl;

n is 1 or 2;

X is a benzyloxycarbonyl group which can have a nuclear substituent and

Y is a hydrogen ion, or an ammonium derivative ion of the formula



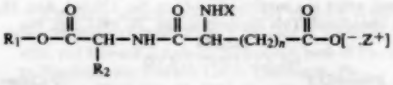
(II)

wherein

R_3 is a side chain group of an amino acid selected from the group consisting of lower alkyl group and a benzyl group which may be further substituted with hydroxyl; and

R_4 is a lower alkyl group; with an organic solvent capable of forming a binary phase system with water; said solvent being present in an amount effective to obtain the transfer of said peptide in the form of a solid from the aqueous phase to the organic solvent phase;

(b) allowing for the transfer from said aqueous phase to said solvent phase of a substantial amount of said solid dipeptide of the formula:



(III)

wherein R_1, R_2, n and X are as previously defined, and Z is Y,

(c) separating said solvent phase containing said solid dipeptide from said aqueous phase; and

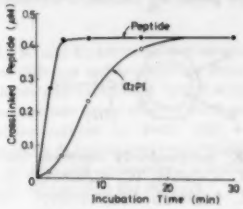
(d) recovering said peptide from said solvent phase.

4,487,718

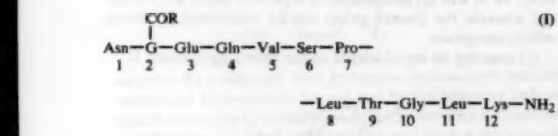
PEPTIDES

Nobuo Aoki, Utsunomiya, and Taro Tamaki, Tokyo, both of Japan, assignors to Kowa Company, Ltd., Nagoya, Japan

Filed Feb. 16, 1984, Ser. No. 580,807
Claims priority, application Japan, Mar. 9, 1983, 58-38564
Int. Cl.³ C07C *103/52*
U.S. Cl. 260—112.5 R **3 Claims**



1. A peptide of the following formula (I):



wherein G-COOH is Glu, and R is an amino or chromophore group.

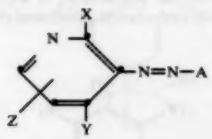
4,487,719

AZO DYES FROM SUBSTITUTED 3-AMINO-PYRIDINES WITH ANILINE, TETRAHYDROQUINOLINE AND BENZOMORPHOLINE COUPLERS

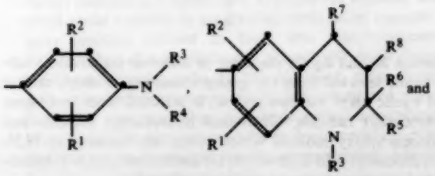
Max A. Weaver, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 368,241, Apr. 14, 1982, abandoned, which is a continuation of Ser. No. 183,879, Sep. 4, 1980, abandoned. This application Feb. 17, 1983, Ser. No. 467,562
Int. Cl.³ C09B *29/036, 29/085, 29/09, 29/36*
U.S. Cl. 534–768 **9 Claims**

1. A compound having the formula



in which A is a coupler selected from those of the formulae



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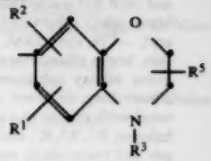
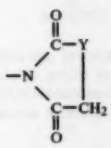


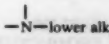
wherein

R^1 and R^2 are each selected from hydrogen, fluorine, chlorine, bromine, lower alkyl, cycloalkyl, lower alkoxy, phenoxy, lower alkylthio, arylthio, and radicals having the formula —NH—X—R^9 in which X is —CO—, —COO—, or —SO_2— and R^9 is selected from lower alkyl and lower alkyl substituted with halogen, hydroxy, phenoxy, aryl, cyano, cycloalkyl, lower alkylsulfonyl, lower alkylthio, lower alkanoyloxy, and lower alkoxy, and when X in said formula —NH—X—R^9 is —CO—, R^9 is further selected from hydrogen, amino, lower alkenyl, lower alklamino, lower dialkylamino, arylamino, aryl, or furyl;

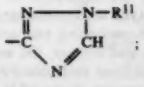
R^3 and R^4 are selected from hydrogen; cycloalkyl; cycloalkyl substituted with one or two groups selected from lower alkyl, —OH, lower alkoxy, halogen and hydroxy substituted lower alkyl; phenyl or phenyl substituted with lower alkyl, lower alkoxy, halogen, lower alkanoylamino, cyano or lower alkoxycarbonyl; straight or branched lower alkenyl; R^3 and R^4 combined as pentamethylene, ethyleneoxyethylene or ethylenesulfonylethylene; straight or branched alkyl of 1–8 carbons and such alkyl substituted with the following: hydroxy; halogen, cyano; amino; lower alkoxy; lower alkoxyalkoxy; lower hydroxyalkoxy, succinimido; glutarimido; phenylcarbamoyloxy; phthalimido; phthalimidino; 2-pyrrolidono; cyclohexyl; phenoxy; phenyl or phenyl substituted with lower alkyl, lower alkoxy, halogen, lower alkanoylamino, cyano or lower alkoxycabonyl; lower alkanoylamino; lower alkylsulfamoyl; vinylsulfonyl; acrylamido; phthalimido; benzoylsulfonicimido; lower alkylsulfonamido; phenylsulfonamido; lower alkoxycarbonylamino; lower alkylcarbamoyloxy; lower alkoxycarbonyl; lower alkoxycarbonyloxy; lower alkenylcarbonylamino; a group having the formula



wherein Y is —NH—,



—O—, —S—, or —CH_2O—; —S—R^{10} wherein R^{10} is lower alkyl, phenyl, phenyl substituted with halogen, lower alkyl, lower alkoxy, lower alkanoylamino, cyano, or lower alkoxycarbonyl, pyridyl, pyrimidinyl, benzoxazolyl, benzimidazolyl, benzothiazolyl, or



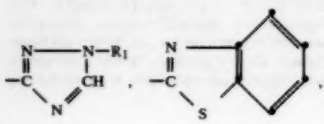
—OXR^9; —NH—X—R^9; —X—R^9; —$CONR^{11}R^{11}$;

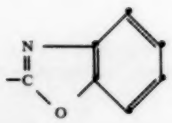
$-SO_2NR^{11}R^{11}$; wherein R^9 and X are as defined above and each R^{11} is selected from H, phenyl, lower alkyl, and lower alkyl substituted with halogen, —OH, phenoxy, aryl, —CN, cycloalkyl, lower alkylsulfonyl, lower alkylthio, lower alkanoyloxy, or lower alkoxy; lower alkoxy; lower alkoxy substituted with hydroxy, cyano, lower alkanoyloxy, or lower alkoxy; phenoxy; phenoxy substituted with one or more of lower alkyl, lower alkoxy or halogen; R^5, R^6, R^7, and R^8 are each selected from hydrogen and lower alkyl; and

X, Y, and Z are independently selected from hydrogen, halogen, lower alkyl, lower alkoxy, aryl, cyano, carbamoyl, $CONHR_{12}$,

SO_2R_{12}, $COOR_{12}$, SO_2NHR_{12},

formyl, nitro, SCN, and SR_{14}, wherein R_{12} is a group selected from lower alkyl, cycloalkyl, and aryl, each of which R_{12} groups is unsubstituted or substituted with —CN, lower alkoxy, lower alkyl (for the cycloalkyl and aryl), hydroxy, lower alkanoyl or lower alkanoyloxy, R_{13} is lower alkyl, lower alkyl substituted with cycloalkyl, or aryl, each of which substituents itself is unsubstituted or substituted with —CN, lower alkoxy, lower alkyl, hydroxy, lower alkanoyl or lower alkanoyloxy, and R_{14} is a group selected from R_{12} and the radicals





pyridyl, pyrimidinyl, and 1,3,4-thiadiazol-2-yl, and with the proviso that at least one of X and Y must always be cyano, SO_2R_{12}, SR_{14}, carbalkoxy, formyl, or nitro.

4,487,720

SEPARATION AND PRODUCTION OF ORGANIC SATURATED MONOCARBOXYLIC ACIDS

Olan S. Fruchey, Corpus Christi, Tex., assignor to Celanese Corporation, New York, N.Y.

Filed Sep. 27, 1982, Ser. No. 423,899

Int. Cl.³ C11C *1/08*

U.S. Cl. 260—419 **22 Claims**

1. In a process for the separation of an organic saturated aliphatic monocarboxylic acid containing from 5 to 9 carbon atoms from a solution containing said acid, the corresponding aldehyde, manganese and copper, the improvement comprising distilling said acid from said solution in the presence of a sufficient amount of oxygen dispersed in the liquid to prevent copper from plating out on the distillation equipment.

4,487,721

PROCESS FOR PRODUCING 2-AMINO-2-ARYLACETONITRILES

Romeo Ciabatti, Milan, Italy, assignor to Gruppo Lepetit S.p.A., Milan, Italy

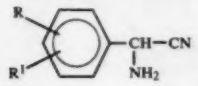
Filed Jun. 7, 1983, Ser. No. 502,042

Claims priority, application Italy, Jun. 16, 1982, 21879 A/82

Int. Cl.³ C07C *121/78*

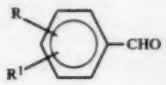
U.S. Cl. 260—465 E **15 Claims**

1. A process for preparing 2-amino-2-aryl-acetonitriles of formula I



wherein R and R^1 independently represent hydrogen, hydroxy, hydroxy(C_1–C_4)alkyl, (C_1–C_4)alkoxy, (C_1–C_6)alkyl, 2-furyl, 2-thienyl, 4-pyridyl, 1-pyrrolydinyl, 1-piperidinyl, 4-morpholinyl, 1-piperazinyl, 4-methyl-1-piperazinyl, 4-phenylpiperazinyl, phenyl optionally substituted with from 1 to 3 substituents selected from (C_1–C_4)alkyl and (C_1–C_4)alkoxy, or R and R^1 independently represent phenyl(C_1–C_4)alkyl wherein the phenyl group can be substituted as above, which comprises:

(a) reacting an arylaldehyde of the following formula II



wherein R and R^1 are as above, with a molar excess of aqueous chloroform, optionally in the presence of a suitable organic solvent, under basic condition and in presence of an overpressure of ammonia;

(b) recovering the reaction product according to usual techniques.

4,487,722

METHOD OF PREPARING 4-(α-HYDROCARBYL-α-CYANOMETHYL)2,6-DI-SUBSTITUTED PHENOLS

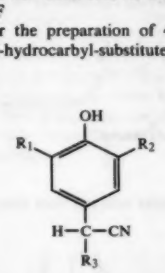
Charles R. Everly, and Jerry M. Roper, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Jul. 20, 1983, Ser. No. 515,645

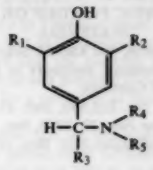
Int. Cl.³ C07C *121/75, 69/66*

U.S. Cl. 260—465 F **33 Claims**

1. A process for the preparation of 4-(α-hydrocarbyl-α-cyanomethyl)2,6-di-hydrocarbyl-substituted phenol having the formula

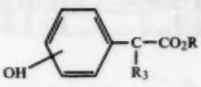


wherein R_1 and R_2 are the same or different monovalent substitutents selected from the group consisting of alkyl, aralkyl and cyclic alkyl radicals and R_3 is selected from hydrogen, hydrocarbyl radicals, substituted hydrocarbyl radicals and hydrocarbyloxy radicals which comprises reacting an N,N-dihydrocarbyl-4-(α-hydrocarbyl-α-aminomethyl)2,6-di-hydrocarbyl-substituted phenol having the formula

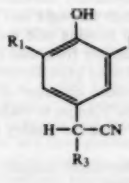


wherein R_1, R^2 and R_3 are as defined above and R_4 and R_5 are the same or different and are selected from hydrogen, hydrocarbyl radicals and substituted hydrocarbyl radicals with an alkali metal cyanide or an alkaline earth metal cyanide in an inert reaction solvent to form said 4-(α-hydrocarbyl-α-cyanomethyl)2,6-di-hydrocarbyl-substituted phenol.

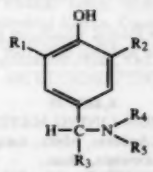
19. A process for preparing α-hydrocarbyl-4-hydroxyphenylacetic acid having the formula



wherein R_3 is selected from hydrogen, hydrocarbyl radicals, substituted hydrocarbyl radicals and hydrocarbyloxy radicals which comprises (i) preparing a 4-(α-hydrocarbyl-α-cyanomethyl)2,6-dihydrocarbyl substituted phenol having the formula



wherein R_1 and R_2 are the same or different monovalent substituents selected from the group consisting of alkyl, aralkyl and cyclic alkyl radicals, and R_3 is as defined above by reacting an N,N-dihydrocarbyl-4-(α-hydrocarbyl-α-aminomethyl) 2,6-di-hydrocarbyl-substituted phenol having the formula



wherein R_1, R_2 and R_3 are as defined above and R_4 and R_5 are the same or different and are selected from hydrogen, hydrocarbyl radicals and substituted hydrocarbyl radicals, with an alkali metal cyanide or an alkaline earth metal cyanide in an inert reaction solvent to form said 4-(α-hydrocarbyl-α-cyanomethyl) 2,6-di-substituted phenol, (ii) dealkylating the substituent groups ortho to the hydroxyl group from said 4-(α-hydrocarbyl-α-cyanomethyl)2,6-di-substituted phenol to form the corresponding 4-(α-hydrocarbyl-α-cyanomethyl)-phenol, and (iii) converting said 4-(α-hydrocarbyl-α-cyanomethyl)phenol by hydrolysis to the corresponding α-hydrocarbyl-4-hydroxyphenylacetic acid.

4,487,723

SUBSTITUTED-BUTANEDIPEROXOIC ACIDS AND PROCESS FOR BLEACHING

James M. Mayer, Maryland Heights, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Jan. 4, 1982, Ser. No. 336,542
Int. Cl.³ C07C *179/10*
U.S. Cl. 260—502 R **6 Claims**

1. A compound represented by the formula:

wherein R is alkyl of 10 to 18 carbon atoms or phenyl.

4,487,724

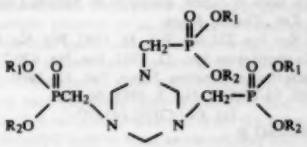
METHOD FOR PREPARATION OF N-PHOSPHONOMETHYLGLYCINE

Raymond A. Felix, Richmond, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 410,802, Aug. 23, 1982, Pat. No. 4,429,124.
This application Nov. 21, 1983, Ser. No. 553,451
Int. Cl.³ C07F *9/38*
U.S. Cl. 260—502.5 F **9 Claims**

1. A method of preparing N-phosphonomethylglycine comprising

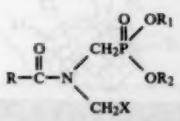
(a) reacting O,O-dialkylaminomethylphosphonate with formaldehyde to produce a triazine compound of the formula



wherein R_1 and R_2 are both aromatic or aliphatic groups;

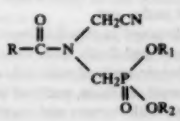
(b) reacting the triazine formed in step (a) with an acyl halide of the formula

wherein X is chlorine, bromine, or iodine and R is an aliphatic or aromatic group to form the O,O-dialkyl-N-phosphonomethyl-N-chloromethyl acetamide of the acyl halide, which has the formula



wherein R, R_1, R_2 and X are as defined,

(c) reacting the amide formed in step (b) with metal cyanide to form O,O-dialkyl-N-cyanomethyl-Nacetamide, which has the structural formula



wherein R, R_1 and R_2 are as defined; and

(d) hydrolyzing the acetamide formed in step (c) to yield N-phosphonomethylglycine.

4,487,725

PROCESS FOR THE PREPARATION OF N-ACETYLAMINOARYLSULFONIC ACIDS IN SULFURIC ACID AS SOLVENT

Otto Arndt, Hofheim am Taunus, and Theodor Papenfuhs, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed May 17, 1983, Ser. No. 495,510

Claims priority, application Fed. Rep. of Germany, May 26, 1982, 3219651

Int. Cl.³ C07C *143/58, 143/60*

U.S. Cl. 260—507 R 5 Claims

1. A process for the preparation of N-acetylamino-phenyl-or naphthyl-sulfonic acids by acetylation of amino-phenyl- or naphthyl-sulfonic acids with acetic anhydride or acetyl chloride, which comprises carrying out the acetylation in sulfuric acid as the solvent.

4,487,726

4-METHOXY-2,3,6-TRIMETHYLBENZENESULFONYL CHLORIDE

Masahiko Fujino, Takarazuka, and Osamu Nishimura, Toyonaka, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Division of Ser. No. 233,641, Feb. 11, 1981, Pat. No. 4,368,150. This application Sep. 21, 1982, Ser. No. 420,710

Claims priority, application Japan, Feb. 12, 1980, 55-16456; Nov. 4, 1980, 55-154919; Jan. 5, 1981, 56-560

Int. Cl.³ C07C *143/70*

U.S. Cl. 260—543 R 1 Claim

1. 4-Methoxy-2,3,6-trimethylbenzenesulfonyl chloride.

4,487,727

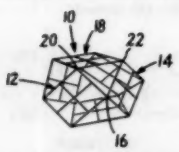
PACKING MATERIAL FOR CONTACTING TOWERS

Joseph F. Ballato, Jr., 23 Orchard St., Mt. Vernon, N.Y. 10552

Filed May 18, 1981, Ser. No. 264,975

Int. Cl.³ B01F *3/04*

U.S. Cl. 261—94 15 Claims



1. A system for promoting the mixing of fluids in a packed tower or the like comprising:

a plurality of polyhedral, fluid permeable cells having a substantial surface area for mixing said fluids in tortuous, countercurrent paths; and

said cells being disposed in interlocking relationship in said tower to prevent said fluids from flowing in channels in said tower, wherein each of said cells comprises a cube-like structure with six faces, each of said faces having a polygonal shape with corners and connected by only one corner to each adjacent face.

4,487,728

MANUFACTURE OF A MOLDING FROM A THERMOPLASTIC POWDER OR GRANULAR MATERIAL

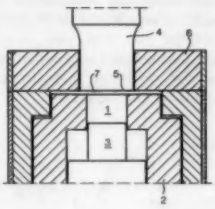
Karl Hagen, Friedelsheim, and Karl H. Scholl, Lambsheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 221,550, Dec. 31, 1981, abandoned. This application Jun. 29, 1983, Ser. No. 509,057

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1980, 3002910

Int. Cl.³ B29F *5/00*

U.S. Cl. 264—23 7 Claims



1. A process for the manufacture of molding blanks from powdered or granular thermoplastic materials which comprises:

(a) introducing powdered or granular thermoplastic material into a cavity of a blank-forming device, said device including a pressure chamber wherein the blanks are shaped, movable platens operatively associated with said chamber, a vibrating plunger having a face adjacent said chamber, and a piston for moving said thermoplastic material into the pressure chamber from said cavity;

(b) heating the powdered or granular thermoplastic material as it enters the pressure chamber of the blank-forming device by causing said plunger to undergo high frequency vibration in contact with the freshly introduced thermoplastic material;

(c) maintaining a predetermined pressure on the thermoplastic material as it is heated;

(d) continuously forcing softened thermoplastic material past the vibrating plunger and into the pressure chamber and replacing the material with unsoftened thermoplastic material; and thereafter

(e) pressing the softened thermoplastic material into a blank by means of the movable platens after the pressure chamber has been filled with the desired amount of thermoplastic material,

whereby, a blank is formed which can be molded to a final shape without the addition of further heat.

4,487,729

FRICTION LINING MATERIAL

Edward R. Kaufman, Andover, Mass., assignor to P. T. Brake Lining Company, Lawrence, Mass.

Division of Ser. No. 430,775, Sep. 30, 1982, Pat. No. 4,461,643, which is a continuation-in-part of Ser. No. 402,831, Jul. 29, 1982, abandoned, and Ser. No. 259,857, May 4, 1981, abandoned, and Ser. No. 98,996, Nov. 30, 1979, abandoned. This application Mar. 15, 1983, Ser. No. 475,498

Int. Cl.³ B29H *5/26;* B29J *5/00*

U.S. Cl. 264—26 10 Claims

1. A process for manufacturing a friction material substantially free of asbestos for use as a brake lining which comprises the steps of:

blending expanded vermiculite having an average minimum particle size of about 0.15 mm, thermosetting resin and filler material to form a mixture said vermiculite and thermosetting resin being present in the friction material

in a weight ratio of resin-to-vermiculite in a range from about 1.5/1 to 0.15/1,

passing the mixture to a preform mold cavity having a shape approximately that of the desired product, and compressing the mixture into the preform mold cavity at about room temperature and pressure of between about 300 psig and 5500 psig for a period of at least 2 seconds to form a preform,

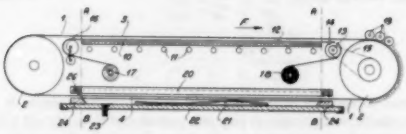
passing the preform to a second mold cavity wherein it is compressed at pressures of between about 1500 to 2500 psig at a temperature of 280° F. to 360° F. for a period of between about 2 and 14 minutes to form a friction material.

4,487,730

PROCESS FOR DRAPING LAYERS OF COMPOSITE MATERIALS

André P. Larribe, Le Pecq, France, assignor to Societe Nationale Industrielle Aerospatiale, France

Filed Aug. 17, 1982, Ser. No. 408,996
Claims priority, application France, Aug. 19, 1981, 81 15910
Int. Cl.³ B29C *17/04*; B29D *9/04*
U.S. Cl. 264—40.1 **6 Claims**



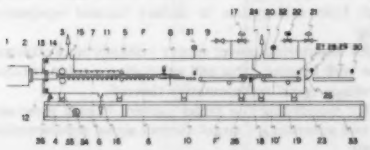
1. A process for draping layers of composite material over moulding equipment, comprising for each said layer in turn the steps of causing an image of the outline of a said layer to appear on a section of carrier material at a first station, depositing said layer on said section of carrier material in register with said image of its outline, transferring said section of carrier material to a second station opposite said moulding equipment while maintaining said layer in a fixed position relative to said section of carrier material, and producing a reduced pressure between said layer and said moulding equipment whereby said layer is placed and compacted on said moulding equipment or on another said layer previously draped thereover.

4,487,731

PROCESS AND APPARATUS FOR PRODUCING FOAMED SYNTHETIC RESIN BODIES

Osamu Kobayashi, Osaka, Japan, assignor to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Sep. 30, 1983, Ser. No. 537,832
Claims priority, application Japan, Oct. 2, 1982, 57-173787
Int. Cl.³ B29D *27/00*
U.S. Cl. 264—51 **42 Claims**



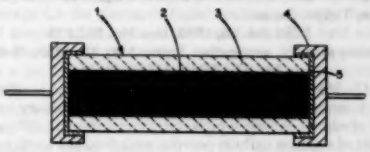
1. A process for producing a foamed resin body comprising the steps of continuously extruding a foamable resin from an extruder into a reduced pressure zone, subjecting the extrudate to an expansion molding step, a cooling-hardening step, characterized by cutting the extrudate to obtain a foamed piece of predetermined length and separating the foamed piece of predetermined length from the preceding process steps when it has reached a specified position and restoring the foamed piece to a normal pressure, and subsequently discharging it to atmosphere.

4,487,732

METHOD OF FABRICATING ARC LIMITING REFRACTORY RESISTIVE ELEMENT

Frank C. Palilla, Framingham, Mass.; Burton W. MacAllister, Jr., Hudson, N.H., and John F. McKenna, Newburyport, Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Division of Ser. No. 303,316, Sep. 17, 1981, Pat. No. 4,418,327.
This application Jul. 15, 1983, Ser. No. 513,891
Int. Cl.³ C04B *35/64*
U.S. Cl. 264—61 **12 Claims**



1. A process for fabricating an arc limiting refractory resistive element comprising:

densifying a mixture consisting essentially of polycrystalline aluminum oxide, from about 0.3 weight percent to about 1.0 weight percent of an electrically conductive refractory material and less than about 0.2 weight percent sintering aid to a theoretical density from about 88 percent to about 93 percent to form a densified body; and

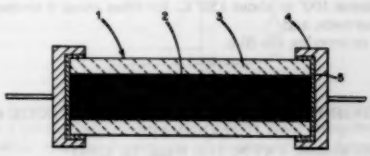
oxidizing said densified body to remove said electrically conductive refractory material from the outer region of said densified body to form an electrically non-conductive outer region.

4,487,733

METHOD OF FABRICATING ARC LIMITING REFRACTORY RESISTIVE ELEMENT

Frank C. Palilla, Framingham, Mass.; Burton W. MacAllister, Jr., Hudson, N.H., and John F. McKenna, Newburyport, Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Division of Ser. No. 303,316, Sep. 17, 1981, Pat. No. 4,418,327.
This application Jul. 15, 1983, Ser. No. 514,074
Int. Cl.³ C04B *35/64*
U.S. Cl. 264—61 **23 Claims**



1. A process for fabricating an arc limiting refractory resistive element comprising:

mixing polycrystalline aluminum oxide with from about 0.3 weight percent to about 1.0 weight percent of an electrically conductive refractory material, less than about 0.2 weight percent sintering aid and water to form a relatively uniform slurry;

milling said slurry;

drying said slurry to a powder;

compacting said powder resulting from the drying step to form a monolithic body;

sintering said monolithic body to a sufficient temperature in an atmosphere containing magnesium oxide, aluminum oxide, carbon, and an inert gas to form a densified body having a theoretical density from about 88 percent to about 93 percent; and

heating said densified body in an oxidizing atmosphere at a sufficient temperature and period of time to remove said electrically conductive refractory material from said outer region of said densified body to form an electrically non-conductive outer region.

4,487,734

METHOD FOR THE PREPARATION OF A HIGH DENSITY SINTERED BODY OF SILICON CARBIDE

Kentaro Sawamura, Ichikawa, Japan, assignor to TDK Corporation, Tokyo, Japan

Filed Jul. 26, 1983, Ser. No. 517,373
Claims priority, application Japan, May 10, 1983, 58-81563
Int. Cl.³ C04B *33/34, 33/36*
U.S. Cl. 264—61 **8 Claims**

1. A method for the preparation of a high-density sintered body of silicon carbide which comprises admixing 100 parts by weight of a silicon carbide powder with from 0.1 to 20 parts by weight of an aluminum borate in a powdery form and a carbonizable organic compound in an amount capable of giving from 1 to 15 parts by weight of residual carbon after pyrolysis to give a powdery blend, shaping the powdery blend into a form and sintering the thus shaped form of the powdery blend.

4,487,735

PROCESS FOR PREPARING FILM OF POLY{[BENZO(1,2-D:4,5-D')BISTHIAZOLE-2,6-DIYL]-1,4-PHENYLENE}, ITS CIS ISOMER OR MIXTURES THEREOF

Edward C. Chenevey, North Plainfield, and Ronald Kafchinski, Winfield, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Apr. 11, 1983, Ser. No. 483,797
Int. Cl.³ B29D *7/20*
U.S. Cl. 264—85 **16 Claims**

1. A process for preparing film of poly{[benzo(1,2-d:4,5-d')bisthiazole-2,6-diyl]-1,4-phenylene}, its cis isomer or mixtures thereof comprising:

(a) forming a solution of poly{[benzo(1,2-d:4,5-d')bisthiazole-2,6-diyl]-1,4-phenylene}, its cis isomer or mixtures therof;

(b) extruding a film of the solution on a casting roll which rotates at a surface speed greater than the speed of extrusion thereby yielding a stretch of from about 100 to about 2400%;

(c) washing the film;

(d) subjecting the film to a temperature in the range of from about 100° to about 150° C. for from about 5 to about 30 seconds; and

(e) recovering the film.

4,487,736

METHOD FOR FORMING A HAND-HEWN LOOK ON A LAMINATE

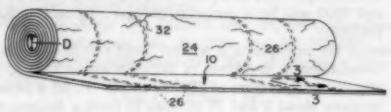
Clay G. Simons, 1701 N. 21st, Boise, Id. 83702

Filed Jan. 18, 1982, Ser. No. 340,184
Int. Cl.³ B29C *17/02*
U.S. Cl. 264—295 **3 Claims**

2. A method of forming a hand-hewn surface topography in an elongate, planar, relatively non-resilient laminate which includes a compressible foam core mat having a substantially uniform thickness sandwiched between and bonded to layers of substantially non-resilient, crease-retaining material, and a facing sheet bonded to one of the layers said method comprising

rolling the laminate along its length, with the facing sheet on the outside thereof, sufficiently tightly to produce irregular creases in the laminate extending substantially transversely of the direction of said rolling,

unrolling the web, and



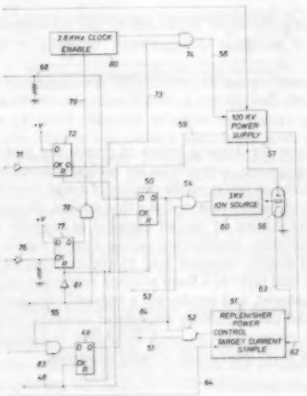
by said rolling and unrolling, generating irregular surface facets in the laminate which appear as irregular angulated planes in the laminate's facing sheet.

4,487,737

PULSED NEUTRON GENERATOR CONTROL CIRCUIT

James R. Bridges, Houston, Tex., assignor to Halliburton Company, Duncan, Okla.

Filed Jan. 25, 1982, Ser. No. 342,535
Int. Cl.³ G21G *4/02*
U.S. Cl. 376—119 **6 Claims**



1. A system for protecting a neutron generator tube of the deuterium-tritium accelerator type and having a replenisher, an ion source and a target electrode, and AC power supplies for said replenisher and said ion source and a high voltage power supply for said target electrode, all carried inside a fluid tight hollow body member sized and adapted for passage through a well borehole and suspended in a well borehole on armored well logging cable having a plurality of electrical conductors for supplying power to said system and for carrying signals from said system to surface located equipment, comprising:

means for monitoring power supply voltages on conductors of the well logging cable and generating a cable conductor voltage signal representative thereof;

means for monitoring the target current in said generator tube and generating a target current signal representative thereof;

means for generating clock pulse signals at one second and 3800 hertz time intervals;

means for monitoring said AC power supplies for said replenisher and said ion source and for generating replenisher output signals and ion source output signals representative thereof; and

means enabled by said clock pulse signals for comparing said cable conductor output signal, said target current output

signal and said AC power supply output signals to representative standard value signal representations of these signals and, upon failing such comparison by any one of said signals against its respective standard, for shutting down operation of said neutron generator tube, thereby protecting said tube.

4,487,738

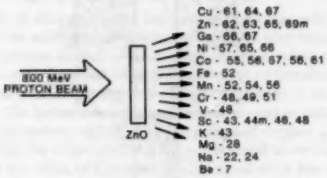
METHOD OF PRODUCING ^{67}CU

Harold A. O'Brien, Jr.; John W. Barnes; Wayne A. Taylor; Kenneth E. Thomas, and Glenn E. Bentley, all of Los Alamos, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 21, 1983, Ser. No. 477,459

Int. Cl.^{3} G21G *1/10*

U.S. Cl. 376—192 **7 Claims**



1. A method of producing ^{67}Cu by proton spallation, comprising the steps of irradiating a target consisting essentially of zinc oxide with a beam of protons having an energy of approximately 800 MeV to produce spallogenic reaction products including ^{67}Cu, and subsequently separating said ^{67}Cu from said reaction products by ion exchange chromatography.

4,487,739

HYDRAULIC SHOCK ABSORBERS

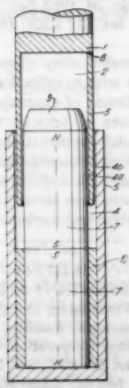
Gordon Thatcher, Lymm, and Daniel F. Davidson, Altrincham, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

Filed Nov. 18, 1980, Ser. No. 208,024

Claims priority, application United Kingdom, Nov. 21, 1979, 7940308

Int. Cl.^{3} G21C *7/20*

U.S. Cl. 376—234 **4 Claims**



1. A liquid metal cooled nuclear reactor including a vessel containing a pool of electrically conducting liquid metal coolant, at least one nuclear fuel assembly submerged in the pool of liquid coolant, a neutron absorber rod releasably suspended above a fuel assembly, a shock absorber disposed in the liquid coolant and of the liquid displacement dash pot kind and including a magneto-hydrodynamic brake comprising means for generating an electromagnetic force for producing pressure gradients electromagnetically along the displacement path of the liquid coolant to create a force opposed to the liquid coolant displacement, the shock absorber being arranged for receiving the absorber rod when released from its suspension and comprising a cylinder for containing liquid metal coolant from said pool, a plunger longitudinally movable within the cylinder and engageable by the absorber rod during its fall, the plunger defining a first passage between it and the cylinder for liquid coolant displaced from the cylinder by insertion of the plunger, permanent magnet means co-axially disposed with the cylinder so as to extend parallel to the first passage, and means locating the permanent magnet means within the cylinder, the plunger having a cup-shaped end within which one end of the permanent magnet means is locatable to define therebetween a second passage for the displaced liquid coolant whereby the permanent magnet means generates a magnetic flux field across the first passage and the second passage, so that in operation there is a maximum hydraulic damping at the commencement of the liquid coolant displacement and maximum magneto-hydrodynamic damping at the termination of the displacement, the latter damping effect increasing progressively as the former damping effect decreases so that deceleration of the plunger and hence of the absorber rod tends towards constancy during displacement of the liquid coolant through the first passage and the second passage.

4,487,740

PROCEDURE AND EQUIPMENT FOR INJECTING GAS INTO LIQUIDS

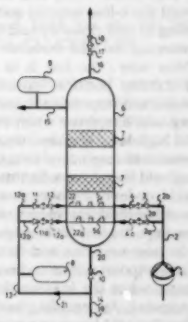
Max Stiefel, Mannheim, and Erich Wolfbeiss, Ettlingen, both of Fed. Rep. of Germany, assignors to Babcock-Brown Boveri Reaktor GmbH, Mannheim, Fed. Rep. of Germany

Filed Oct. 2, 1978, Ser. No. 947,671

Claims priority, application Fed. Rep. of Germany, Oct. 27, 1977, 2748159

Int. Cl.^{3} G21C *17/00*

U.S. Cl. 376—256 **5 Claims**



1. A device for injecting a gas into a stream of reactor coolant for a pressurized water nuclear power plant comprising:

a bubble column, the stream of reactor coolant being directed up therethrough;

motionless mixer means positioned within said bubble column for mixing the stream of reactor coolant;

a gas pump;

gas conduit means for establishing fluid communication between said gas pump and said bubble column below said motionless mixer means;

a plurality of nozzles on said gas conduit means establishing fluid communication between said gas conduit means and the stream of reactor coolant within said bubble column;

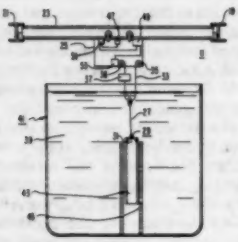
gas analysis measuring apparatus for measuring the gas concentration in the reactor coolant liquid.

4,487,741

TRANSFER OF FUEL ASSEMBLIES

Michael Vuckovich, Elizabeth Township, Allegheny County; John P. Burkett, South Huntingdon, and Joseph Sallustio, Brentwood, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 30, 1981, Ser. No. 325,881
Int. Cl.³ G21C *19/10*
U.S. Cl. 376—271 **6 Claims**



1. Apparatus for removing and/or positioning fuel assemblies of a nuclear reactor during fueling, refueling or the like, the said apparatus including a crane, the said crane having:

(a) a line terminating in a fixture to be engaged with a fuel assembly to be removed and to be disengaged from a fuel assembly positioned by said crane,

(b) a line drive, connected to said line, to drive said line, and

(c) a traverse drive for said crane,

load-sensing means, connected to said line, for sensing a load on said line, setpoint means for setting a high-level load setpoint, a low-level load setpoint and a slack-line setpoint, said high-level setpoint setting an upper limit on the loading of said crane when said line is raising a fuel assembly, said low-level setpoint setting a lower limit on the loading of said crane when said line is lowering a fuel assembly, said slack-line setpoint setting a limit dependent on the loading of said crane by said fixture and line alone, means, connected to said traverse drive, disabling said traverse drive when the line is in a position below its uppermost starting position, means, connected to said setpoint means, and responsive to said load-sensing means, for disabling said line drive when the load on said crane exceeds said high-level setpoint, means, connected to said setpoint means and responsive to said load-sensing means, for disabling said line drive when the load on the crane is less than said low-level setpoint, manual means, connected to said line-drive-disabling means, while the load on the crane is less than the low-level setpoint, for enabling said line-drive to raise said line and fixture, and means, connected to said setpoint means and responsive to said load-sensing means, when the load on the crane is below said slack-line setpoint, for enabling said traverse drive notwithstanding that said line is in a position below its uppermost starting position.

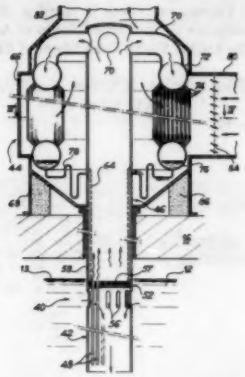
4,487,742

FAST NEUTRON NUCLEAR REACTOR WITH INTERNAL CAPILLARY STRUCTURE PIPING

Antoine Bret, Aix En Provence, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed May 11, 1982, Ser. No. 377,018
Claims priority, application France, May 22, 1981, 81 10227
Int. Cl.³ G21C *15/18*
U.S. Cl. 376—298 **9 Claims**

1. A fast neutron nuclear reactor comprising a vertically axed vessel containing the reactor core and a volume of liquid metal for cooling the same, a horizontal sealing slab sealing the upper part of the vessel, at least one pre-vacuum pump and at least one heat exchanger respectively ensuring in operation the circulation of the liquid metal in the core and its cooling, as well as at least one device for removing the residual power ensuring the cooling of the liquid metal in the case of a stoppage of the pre-vacuum pumps, wherein the residual power removal device comprises an evaporator incorporating a bundle of tubes in glove finger-like form immersed in the liquid



metal, so as to pass into the vapour phase a heat transfer fluid initially in the liquid phase, an adiabatic collector of said vapour phase incorporating a pipe traversing the reactor slab and a condenser in which the heat transfer fluid in the vapour phase exchanges its heat with an external cooling fluid and condenses in the liquid phase before dropping again into the evaporator by the adiabatic collector and wherein the wall of the pipe constituting the collector, as well as the wall of each of the tubes of the evaporator internally have a capillary structure piping the heat transfer fluid in the liquid phase.

4,487,743

CONTROLLED EXPANSION ALLOY

John S. Smith, Proctorville, Ohio, and Darrell F. Smith, Jr., Huntington, W. Va., assignors to Huntington Alloys, Inc., Huntington, W. Va.

Filed Aug. 20, 1982, Ser. No. 409,838
Int. Cl.³ C22C *19/03*
U.S. Cl. 420—459 **7 Claims**

1. An age hardenable alloy characterized by controlled expansion properties with an inflection temperature of at least 625.° F. and a coefficient of expansion between ambient and inflection temperatures of 5.5×10^{-6} per °F. or less, high strength and good notch rupture strength consisting essentially of about 34% to 55% nickel, up to about 25% cobalt, about 1% to 2% titanium, about 1.5% to 5.5% columbium, about 0.25% to 1% silicon, not more than about 0.2% aluminum, not more than about 0.1% carbon and the balance essentially iron.

4,487,744

CORROSION RESISTANT AUSTENITIC ALLOY

Terry A. DeBold, Wyomissing; Douglas G. Frick, Pottstown, and John S. Kutzamanis, Reading, all of Pa., assignors to Carpenter Technology Corporation, Reading, Pa.

Filed Jul. 28, 1982, Ser. No. 402,638
Int. Cl.³ C22C *30/00*
U.S. Cl. 420—584 **22 Claims**

1. An austenitic stainless corrosion resistant alloy having good resistance to pitting and crevice corrosion in oxidizing chloride-bearing media combined with resistance to general

corrosion and to intergranular corrosion in oxidizing media, said alloy consisting essentially in weight percent of about

	w/o
C	0.06 Max.
Mn	1.4 Max.
Si	0.9 Max.
P	0.035 Max.
S	0.035 Max.
Cr	20–26
Ni	34–44
Mo	3–<5.1
Cu	0.1–<3.1
N	0.4 Max.
B	0.005 Max.
Ce + La	0.4 Max. Added
Nb	1 Max.
Ti	0.5 Max.

the amount of nitrogen being not greater than that which can be retained in solution, the amount of cerium plus lanthanum being the amount added, niobium plus titanium when present ranging from a minimum which is sufficient to combine stoichiometrically with the amount of carbon present in excess of 0.025 w/o, the balance being essentially iron, and in which the elements chromium, nickel, molybdenum and copper are balanced so that the value of Correlation I is equal to or less than 1.6021 and the value of Correlation II is equal to or less than 5, Correlation I being defined as

$$7.0011-0.2269(\%\ Cr)-0.0769(\%\ Ni)$$
$$-0.046(\%\ Mo)+0.03(\%\ Cu)+0.0017(\%\ Ni)^2$$
$$+0.0486(\%\ Mo)^2-0.0066(\%\ Ni)(\%\ Mo),$$

and Correlation II being defined as

$$14.7182-0.3759(\%\ Cr)+0.0986(\%\ Ni)$$
$$-1.2976(\%\ Mo)+0.02(\%\ Cu)-0.0165(\%\ Cr)(\%\ Mo)$$
$$-0.0202(\%\ Cr)(\%\ Cu)+0.0223(\%\ Ni)(\%\ Cu).$$

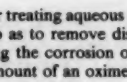
4,487,745

OXIMES AS OXYGEN SCAVENGERS

Charles O. Weiss, Plainsboro, and Dwight E. Emerich, Lincoln Park, both of N.J., assignors to Drew Chemical Corporation, Boonton, N.J.

Filed Aug. 31, 1983, Ser. No. 528,255
Int. Cl.³ C23F *11/04*
U.S. Cl. 422—16 **12 Claims**

1. A composition for treating aqueous systems, such as steam generating systems, so as to remove dissolved oxygen therefrom thereby inhibiting the corrosion of metal surfaces comprising an effective amount of an oxime of the formula:



in which R_1 and R_2 are the same or different and are selected from hydrogen, lower alkyl groups of 1–8 carbon atoms or aryl groups.

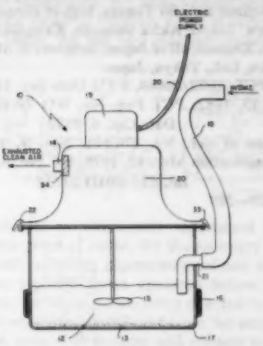
4,487,746

ARC BY-PRODUCTS EVACUATION AND NEUTRALIZATION SYSTEM

Vasu H. Tahiliani, San Jose, Calif., assignor to Electric Power Research Institute, Palo Alto, Calif.

Continuation of Ser. No. 285,040, Jul. 20, 1981, abandoned. This application Feb. 17, 1983, Ser. No. 467,276
Int. Cl.³ B01F *3/04*
U.S. Cl. 422—170 **4 Claims**

1. A powdery arc by-product evacuation and neutralization system comprising a vacuum cleaner type sweeper, said sweeper including a non-corrosive plastic tank containing an alkaline solution, said plastic tank having an input port extending completely into said alkaline solution, a vacuum pump mounted on the top of said tank for drawing corrosive powdery arc by-products through said input port such that said by-products are drawn completely into said alkaline solution, said vacuum pump including a jet action fan extending completely into said alkaline solution for causing said alkaline solution to be agitated such that said alkaline solution absorbs said powdery arc by-products thereby sweeping and chemically neutralizing said by-products in one step, said plastic tank including a heater element for heating said alkaline solution to a predetermined temperature range of approximately 40° C.–60° C. to bring about optimal chemical reaction, means for exhausting said cleansed air through said output port, said output port including a chemical filter to promote a chemical reaction and to prevent escape of trace quantities of said undesirable arc by-products.



4,487,747

PRODUCTION OF METAL CHLORIDES

Michael Robinson, and Alan D. Crosby, both of South Humberside, England, assignors to Laporte Industries Limited, London, England

Filed May 5, 1983, Ser. No. 491,759
Int. Cl.³ C22B *1/00*
U.S. Cl. 423—60 **15 Claims**

1. A process for the production of metal chlorides from a material comprising more than one metal oxide of which metal oxides one is chlorinatable at a temperature above 800° C. to produce a vaporous metal chloride product and the one or more others are chlorinatable at the said temperature to produce metal chlorides which accumulate in the material, the process comprising the steps of

(a) conducting the fluidised bed chlorination of the material at a temperature above 800° C. in the presence of a quantity of carbon in a theoretical excess over that required to combine with the oxygen content of the metal oxides in the material chlorinatable at the said temperature;

(b) removing from the fluidised bed vaporous metal chloride product formed in the course of the chlorination;

(c) interrupting the chlorination of at least a portion of the material in which portion only a part of the metal oxide corresponding to the vaporous metal chloride has become chlorinated;

(d) treating the said portion of the material by subjecting it, in the form of still hot fluidised bed solids, to the action of an oxygen-containing gas so as to strip the said portion, at least partially, of chlorides accumulated therein;

(e) continuing the fluidised bed chlorination of the so treated portion of the material at a temperature above 800° C. to chlorinate a further portion of the material therein to produce a further quantity of vaporous metal chloride; and

(f) removing from the fluidised bed the further quantity of

vaporous metal chloride formed in the course of the continued chlorination.

4,487,748

PROCESS FOR TREATING EXHAUST GASES

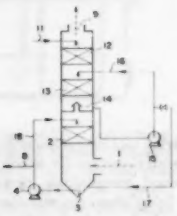
Yoshio Onojima; Kenichi Yoneda, both of Hiroshima; Yoshihiko Kamimura, Tokyo; Akira Shimada, Kawasaki, and Masahiko Noguchi, Koganei, all of Japan, assignors to Mitsubishi Heavy Industries, Ltd., Tokyo, Japan

PCT No. PCT/JP79/00064, § 371 Date Sep. 13, 1982, § 102(e) Date Sep. 13, 1982, PCT Pub. No. WO 79/00754, PCT Pub Date Oct. 4, 1979

Continuation of Ser. No. 170,661, Nov. 9, 1979. This PCT application Mar. 13, 1979, Ser. No. 417,164

Int. Cl.³ B01D *53/34*

U.S. Cl. 423—240 2 Claims



1. A continuous process for treating exhaust gases to remove undesirable chemical components which comprises passing the exhaust gases through a gas treating system countercurrent to a liquid cleaning medium comprising an aqueous caustic soda solution, said system comprising a plurality of absorption segments arranged downstream of said exhaust gases comprising a first absorption segment and at least one intermediate segment said gas passing directly through each of said segments which comprises:

1. Introducing exhaust gas to be treated into said absorption segment,
2. Introducing fresh make-up cleaning medium exclusively downstream of the last absorption segment,
3. Permitting the cleaning medium to pass through said last absorption segment and a first intermediate absorption segment upstream of the last absorption segment,
4. Collecting the cleaning medium after it passes through the first intermediate absorption segment and recirculating a first portion of the collected cleaning medium through said first intermediate absorption segment,
5. Circulating a second portion of the collected medium to bypass a second intermediate absorption segment and recirculating a first portion of the collected medium which has bypassed the second intermediate absorption segment to permit said portion to pass through said second intermediate absorption segment,
6. Repeating Steps 4 and 5 with successive intermediate absorption segments when such segments are present until said first absorption segment is reached,
7. Recirculating a first portion of the collected medium which has passed the last of the intermediate absorption segments to permit said portion to pass through said last intermediate absorption segment, and
8. Removing from the system a second portion of collected cleaning medium from said first absorption segment, the amount of cleaning medium removed being substantially equal to the amount of fresh make-up cleaning liquid introduced into said last absorption segment.

4,487,749

DICALCIUM PHOSPHATE DIHYDRATE HAVING IMPROVED MONOFLUOROPHOSPHATE COMPATIBILITY AND PROCESS FOR THE PREPARATION THEREOF

Fawzy G. Sherif, Stony Point; Helmut W. Majewski, Nyack, and Francis A. Via, Yorktown Heights, all of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 336,215, Dec. 31, 1981, abandoned. This application Jul. 8, 1983, Ser. No. 511,727

Int. Cl.³ C01B *25/32*

U.S. Cl. 423—309 4 Claims

1. A process for preparing dicalcium phosphate dihydrate having improved monofluorophosphate compatibility which consists essentially of the steps of:

(a) reacting a slaked lime slurry with phosphoric acid to form a monocalcium phosphate solution;
(b) further reacting said monocalcium phosphate solution with additional slaked lime slurry to form a dicalcium phosphate dihydrate slurry having a final pH ranging from above about 2.2 to below about 5.5;
(c) separating the dicalcium phosphate dihydrate from said slurry.

4,487,750

STABILIZATION OF WET PROCESS PHOSPHORIC ACID

Vivian C. Astley, New Orleans, and Jody J. Taravella, Harvey, both of La., assignors to Freeport Minerals Company, New York, N.Y.

Filed Aug. 1, 1983, Ser. No. 519,181

Int. Cl.³ C01B *25/16*

U.S. Cl. 423—321 R 11 Claims

1. A method of producing wet process phosphoric acid with low post-precipitation characteristics from an unclarified dilute wet process phospheric acid solution having a weight ratio of Fe_2O_3 to P_2O_5 substantially higher than 0.03 which comprises:

(a) concentrating said unclarified dilute wet process phosphoric acid solution having a weight ratio of Fe_2O_3 to P_2O_5 substantially higher than 0.03 in a first evaporation zone until the P_2O_5 content of the solution is between 45 and 55%;
(b) subjecting the concentrated acid solution to crystallization for at least 8 hours;
(c) clarifying the crystallized acid solution by centrifugation until its total solids content is less than 2%; and
(d) concentrating said clarified acid solution in a second evaporation zone until the P_2O_5 content of said clarified acid solution is between 58 and 63% to provide a wet process phospheric acid with low post-precipitation characteristics.

4,487,751

PROCESS FOR CALCIUM HYPOCHLORITE

Craig A. Foster, and John H. Shaffer, both of Cleveland, Tenn., assignors to Olin Corporation, Cheshire, Conn.

Filed Jun. 15, 1983, Ser. No. 504,704

Int. Cl.³ C01B *11/06*

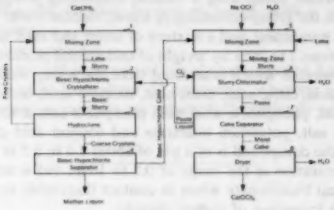
U.S. Cl. 423—474 17 Claims

1. A process for producing basic calcium hypochlorite which comprises:

(a) wetting lime with an aqueous slurry of fine basic calcium hypochlorite crystals in a mixing zone to form an aqueous lime slurry;
(b) reacting said aqueous lime slurry with a calcium hypochlorite solution in a crystallizing zone to produce a slurry of basic calcium hypochlorite crystals;
(c) separating said slurry of basic calcium hypochlorite crystals in a first separation means into a slurry of fine basic calcium hypochlorite crystals and a slurry of coarse basic calcium hypochlorite crystals, said fine basic cal-

cium hypochlorite crystals being less than about 50 microns in size;

(d) returning said slurry of fine basic calcium hypochlorite crystals to said mixing zone;



(e) conveying said slurry of coarse basic calcium hypochlorite to a second separation means to separate coarse crystals of basic calcium hypochlorite from a calcium hypochlorite mother liquor; and

(f) recovering said coarse crystals of basic calcium hypochlorite.

4,487,752

METHOD FOR PRODUCING IODINE OR IODINE DERIVATIVES

Atsushi Shimizu, and Kazunori Yamataka, both of Nobeoka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Aug. 8, 1983, Ser. No. 521,232

Claims priority, application Japan, Aug. 10, 1982, 57-137850; Aug. 11, 1982, 57-138376; Oct. 20, 1982, 57-182986; Oct. 20, 1982, 57-182987

Int. Cl.³ C01B *7/14*

U.S. Cl. 423—507 **18 Claims**

1. A method for producing iodine or iodine derivatives which comprises oxidizing amonium iodide with oxygen or oxygen-containing gas in a medium containing a transition metal compound, a weak acid and water to produce the iodine or iodine derivatives.

4,487,753

SULFUR PRODUCTION

Stephen N. Massie, Palatine, and Allen R. Broyles, Buffalo Grove, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Dec. 9, 1983, Ser. No. 560,064

Int. Cl.³ C01B *17/05*

U.S. Cl. 423—573 R **8 Claims**

1. A process for producing liquid elemental sulfur from a gaseous feed stream containing from 0.1% to 50% H_2S and having a predominant amount of CO_2 by volume, which process comprises contacting said gas with at least a stoichiometric amount of gaseous oxygen in the presence of liquid water and a catalyst comprising a transition metal phthalocyanine compound dispersed on a fixed bed support, at a pH value ranging from 1 to 7, a temperature ranging from 120° to 370° C. and a pressure of from about 2 to 150 atmospheres absolute to selectively convert said H_2S to liquid elemental sulfur.

4,487,754

SYSTEM AND PROCESS FOR PRODUCING AND RECOVERING ELEMENTAL SULFUR

Robert L. Reed, Tulsa, Okla., assignor to Standard Oil Company (Indiana), Chicago, Ill.

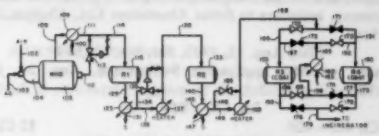
Filed Jul. 29, 1983, Ser. No. 518,504

Int. Cl.³ C01B *17/04*

U.S. Cl. 423—574 R **6 Claims**

1. In a four-catalytic reaction zone Cold Bed Adsorption process of the type including the steps of reacting acid gas and air in a thermal reaction zone, reacting the resulting gas in the plurality of catalytic reaction zones arranged in series and maintained at progressively reduced temperatures, the effluent from each catalytic reaction zone being cooled to recover sulfur and the gas being then heated to a desired temperature and fed to the subsequent catalytic reaction zone, the last two of said catalytic reaction zones each being periodically maintained below the dew point of sulfur for the recovery of sulfur and the catalyst in each of said last two catalytic reaction zones being periodically regenerated, the improvement comprising:

operating all four catalytic reaction zones in series for the recovery of sulfur, the last two catalytic reaction zones



being periodically simultaneously maintained in series below the dew point of sulfur, for the recovery of sulfur and periodically effecting regeneration of one of the last two catalytic reaction zones operated below the dew point of sulfur, the regeneration being effected by a regeneration gas comprising the effluent from the second catalytic reaction zone after cooling said effluent to recover elemental sulfur therefrom and after heating said cooled effluent to a temperature sufficiently high to regenerate the catalyst but sufficiently low to avoid damaging the catalyst.

4,487,755

PREPARATION OF LARGE CRYSTAL SIZED BARIUM AND/OR STRONTIUM TITANATE POWDER

Ronald H. Arendt, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 394,357, Jul. 1, 1982, abandoned. This application Aug. 11, 1983, Ser. No. 522,085

Int. Cl.³ C01G *23/00*; C01F *11/00*

U.S. Cl. 423—598 **4 Claims**

1. A process for producing large size alkaline earth titanate powder having a preselected average crystal size ranging from about 0.3 micron to about 14 microns which consists essentially of providing particulate TiO_2 in stoichiometric amount, providing particulate alkaline earth carbonate in an amount ranging from about 2% by weight to about 10% by weight in excess of stoichiometric amount, said alkaline earth carbonate being selected from the group consisting of $BaCO_3$, $SrCO_3$ and mixtures thereof, providing alkaline earth titanate seed selected from the group consisting of barium titanate, strontium titanate and a solid solution thereof, providing an alkali metal carbonate solvent selected from the group consisting of sodium carbonate, potassium carbonate, lithium carbonate and mixtures thereof, forming a mixture of said TiO_2, said alkaline earth carbonate, said titanate seed and said carbonate solvent, heating said mixture to a reaction temperature at least sufficient to melt said carbonate solvent and ranging from about 873 K. to about 1473 K., each said alkaline earth carbonate being decomposible at said reaction temperature to form the oxide and by-product gas, said carbonate solvent in molten form being a solvent for said TiO_2 and said alkaline earth carbonate, maintaining said reaction temperature continually dissolving and reacting said TiO_2 and alkaline earth carbonate in said molten solvent producing by-product gas and precipitating alkaline earth titanate onto said titanate seed, at said reaction temperature said TiO_2 and said alkaline earth carbonate being slightly soluble in said molten solvent to maintain a reactant-saturated solution, said titanate seed having an average crystal size ranging from submicron to about 10 microns and being used in an amount ranging from about 50% by weight to about 90% by weight of the theoretical amount of said large size alkaline earth titanate powder, said titanate seed not differing signifi-

cantly in chemical composition from said precipitating alkaline earth titanate, said carbonate solvent being used in an amount ranging from about 20% by weight to about 70% by weight of the total amount of said TiO_2, said alkaline earth carbonate, said titanate seed and said carbonate solvent, and recovering the resulting alkaline earth titanate.

4,487,756

PROCESS FOR MANUFACTURING CRYSTALLINE ALUMINA

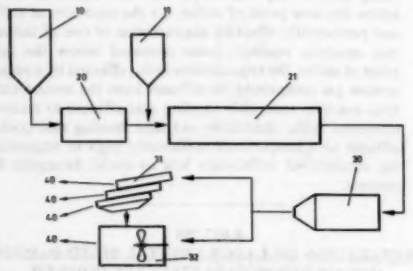
Tiberiu Mizrah, Schaffhausen, Switzerland; Bernhard Scheepers, Speyer, and Bernd Schröder, Cologne, both of Fed. Rep. of Germany, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Aug. 12, 1983, Ser. No. 522,684

Claims priority, application Switzerland, Aug. 24, 1982, 5029/82

Int. Cl.³ C01F 7/02

U.S. Cl. 423—625 **12 Claims**



1. Process for manufacturing crystalline alumina α—Al_2O_3 from aluminum hydroxide including a Na_2O concentration of $\leqq$0.1 wt.% with respect to Al_2O_3, adding to the aluminum hydroxide a mineralizer selected from the group consisting of boron-containing compounds, fluorine-containing compounds and mixtures thereof, wherein said mineralizer has added to it a mineralizer containing ammonium, and calcining said aluminum hydroxide at a temperature from 700° C. up to a temperature above that required for the transformation to α—Al_2O_3 in the presence of said mineralizers to produce said alumina wherein at least 80% of the crystals are 1–10 μm in size and exhibit at most a diameter to height ratio D/H of 2.

4,487,757

DISPENSING CONTAINER OF TOOTHPASTE WHICH EFFERVESCES DURING TOOTHBRUSHING

Diana K. Kiozpeoplou, Somerville, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 334,994, Dec. 28, 1981, abandoned. This application Nov. 22, 1982, Ser. No. 443,072

Int. Cl.³ A61K 7/16; B65D 35/22

U.S. Cl. 424—7.1 **16 Claims**

1. A dispensing container of components of a toothpaste which does not effervesce when extruded from the container onto a toothbrush but does effervesce in the human mouth during toothbrushing, comprising two separate toothpaste portions, which are maintained in stable forms separate and substantially out of contact with each other in different parts of the container prior to extrusion and which are dispensable together from the container in contact with each other without effervescing significantly until used to brush teeth in the mouth, the first portion comprising a vehicle containing about 5 to 35 percent by weight of said first portion of water and including sufficient amounts of a viscous water miscible polyol humectant and a gelling or thickening agent to impart to the portion a pasty consistency, body and non-tacky nature, at least about 15% by weight of sodium bicarbonate and about 1 to 30% by weight of a water insoluble dental polishing agent selected from the group consisting of calcium carbonate, silica, alumina, silica containing combined alumina, zirconium silicate, and mixtures thereof, which is non-reactive with sodium bicarbonate and acts to stabilize it during storage, and the second portion comprising a vehicle containing a liquid selected from the group consisting of water, viscous water miscible polyol humectant, and a mixture of water and such humectant, and about 1 to 20% by weight of said second portion of an acidic compound which is selected from the group consisting of alginic acid, citric acid, malic acid, succinic acid, lactic acid, tartaric acid, phosphoric acid, acid phosphate salt, acid pyrophosphate salt, potassium bitartrate and sodium acid citrate, which acidic compound is of a pH of about 1.5 to 5.5 in water at a concentration in the range of 0.5 to 10%, and is reactive with sodium bicarbonate when in contact therewith, to effervesce with formation of carbon dioxide.

4,487,758

MICROENCAPSULATION OF LIVING TISSUE AND CELLS

Mattheus F. A. Goosen; Geraldine M. O'Shea, both of Toronto, and Anthony M. F. Sun, Willowdale, all of Canada, assignors to Connaught Laboratories Limited, Willowdale, Canada

Filed Jun. 6, 1983, Ser. No. 501,445

Int. Cl.³ A61K 9/24, 35/12; A01N 1/02

U.S. Cl. 424—21 **26 Claims**

1. A biocompatible microcapsule suitable for implantation into an animal body and having a diameter of about 50 to about 2000 μm, comprising:

a macromolecular core material comprising living tissue surrounded by a biocompatible semi-permeable membrane consisting of interpenetrating layers of ionically-interacted biocompatible materials, having a thickness of about 5 to about 20 μm and having an outer biocompatible negatively-charged surface, said biocompatible semi-permeable membrane being in the form of a hydrogel having an overall water content within the membrane structure of at least about 20 wt.%,

said biocompatible semi-permeable membrane being permeable to and permitting nutrients and oxygen to flow from a body in which the microcapsule is implanted to the core material and permitting metabolic products of said living tissue to flow therefrom to the body in which the microcapsule is implanted and being impermeable to core material to retain the living tissue within the microcapsule.

8. A method of encapsulating a core material within a semi-permeable membrane which is a hydrogel having an overall water content within the membrane structure of at least about 20 wt.%, which comprises:

(a) placing the material in an aqueous solution of a water-soluble polymeric substance that can be reversibly gelled and which has free acid groups,

(b) forming the solution into droplets,

(c) gelling the droplets to produce discrete shape-retaining temporary capsules,

(d) forming biocompatible semi-permeable membranes about the temporary capsules by contact between the temporary capsules and a polymer containing free amino groups to cause ionic reaction with the acid groups in a surface layer of the capsule, and

(e) contacting said microcapsules formed in step (d) with a biocompatible polymeric material which contains free negatively-charged groups capable of ionic reaction with the free amino groups in a surface layer of the microcapsule, thereby to form an outer coating of said biocompatible polymeric material on said microcapsules,

said semi-permeable membrane formation and said contact thereof with biocompatible polymeric material being such as to form microcapsules having a diameter of about 50 to about 2000 μm and a semi-permeable membrane thickness of about 5 to about 20 μm.

21. In a method of forming shape-retaining capsules, which comprises:

suspending a macromolecular core material comprising living tissue in an aqueous solution of sodium alginate,

forming the sodium alginate solution into droplets, and

gelling the droplets by ion exchange with a multivalent cation,

the improvement:

wherein said aqueous sodium alginate solution has a viscosity of at least about 30 centipoise, whereby said shape-retaining capsules are substantially perfectly spherical.

4,487,759
TERTIARY AMINE STABILIZED MICRO-ENCAPSULATED COMPOSITIONS CONTAINING BEHAVIOR MODIFYING COMPOUNDS

Brenda F. Nesbitt, Weybridge; David R. Hall, Streatham; Ralph Lester, Heddon-on-the-Wall, and Gordon J. Marrs, Maidenhead, all of England, assignors to Imperial Chemical Industries Limited and National Research Development Corporation, both of London, England

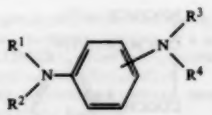
Filed Mar. 5, 1981, Ser. No. 240,990

Claims priority, application United Kingdom, May 5, 1980, 8007581

Int. Cl.³ A61K *9/50, 35/64;* **A01N** *25/28*

U.S. Cl. 424—32 **13 Claims**

1. A micro-encapsulated product comprising a suspension of microcapsules in an aqueous medium, the microcapsules, per se, being unable to fully protect photodegradeable active components contained in said microcapsules against photodegradation, and said microcapsules being of a polymeric material selected from the group consisting of polyamides, polyesters, polycarbonates, polyureas, polyurethanes and synthetic polymers having a polymerization component which is reactive with a primary or secondary amine, and which microcapsules encapsulate a composition comprising a photodegradeable carbon-to-carbon unsaturated insect behaviour modifying compound which compound is selected from the group consisting of (a) a compound secreted by a member of an insect species which can influence the behaviour of a member of the same or a different insect species, (b) a synthetic compound (a), (c) compound (a) derived from a natural source other than a member of an insect species, (d) an analogue of compound (a), (e) an isomer of compound (a), and mixtures thereof, and wherein said analogue and said isomer are synthetically prepared or are derived from a natural source other than a member of an insect species and themself can influence the behaviour of a member of an insect species, and, as stabiliser therefor, a tertiary phenylene diamine of the formula



wherein R^1 represents an aromatic residue containing 6 to 20 carbon atoms, R^2 represents H or an alkyl, alkenyl, cycloalkyl, cycloalkylalkyl, alkaryl, aralkyl, aryl, acyl or acyloxy group, said groups containing 1 to 20 carbon atoms, or a nitroso group and R^3 and R^4, which may be the same or different, each represents an alkyl, alkenyl, cycloalkyl, cycloalkylalkyl, alkaryl, aralkyl, aryl, acyl or acyloxy group, said groups containing 1 to 20 carbon atoms, or a nitroso group, the weight of the stabiliser in the stabilized composition being from 10% to 1000% of the behaviour modifying compound.

4,487,760
HAIR COSMETICS

Hiromi Yamamoto, Chiba, and Takeo Okumura, Sakura, both of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Jan. 19, 1982, Ser. No. 340,764

Claims priority, application Japan, Jan. 19, 1981, 56-6219

Int. Cl.³ A61K *7/06, 7/08*

U.S. Cl. 424—70 **2 Claims**

1. A method of imparting moisture, gloss and lubricity to hair without skin irritation comprising applying to the hair a preparation comprising 0.5–30 wt % of α-mono- (methyl-branched alkyl) glyceryl ether represented by the general formula (I):

$$R\text{-}OCH_2CH(OH)CH_2OH \qquad (I)$$

in which R represents a group of the following formula:

$$CH_3-(CH_2)_m-CH-(CH_2)_n-$$
$$\quad\quad CH_3$$

in which m is an integer of 2–14, n is an integer of 3–11 and m+n is an integer of 9–21, and the balance a carrier selected from the group consisting of hair tonic, hair conditioner, hair pomade, hair oil, hair cream, hair spray and hair setting lotion.

4,487,761
DOPAMINE β-HYDROXYLASE INHIBITORS

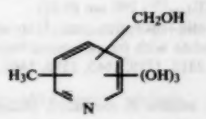
Lucille J. Cole, Roselle Park; Leeyan Huang, Westfield, and Jerrold M. Liesch, Princeton Junction, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Apr. 5, 1982, Ser. No. 365,741

Int. Cl.³ A61K *35/00, 31/44;* **C12P** *1/04;* **C07D** *403/00*

U.S. Cl. 424—118 **6 Claims**

1. A dopamine β-hydroxylase inhibitor of structural formula I:



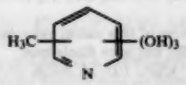
empirical formula $C_7H_9NO_4$, and physical chemical characteristics:

a. colorless crystalline compound,
b. acidic aqueous UV data: 276 nm 261 sh,
c. basic aqueous UV data: 304 nm 227 sh,
d. acidic NMR (D_2O) chemical shifts: 2.48 (s) 4.82 (s),
e. basic NMR (D_2O) chemical shifts: 2.30 (s) 4.68 (s),
f. mass spectral data:
M⁺ 171.0525 (100%)
153.0449 (54%)
125.0589 (32%)
112.0398 (74%),

produced by the controlled aerobic fermentation of an aqueous nutrient medium by *Streptoverticillium hiroshimense,* ATCC 39070 at a temperature of 26° to 30° C. for at least 70 hours at pH 6.0 to 8.0.

2. A dopamine β-hydroxylase inhibitor of structural formula II:

II



empirical formula $C_6H_7NO_3$, and physical chemical characteristics:

a. colorless crystalline compound,
b. acidic aqueous UV data: 276 nm 261 sh,
c. basic aqueous UV data: 304 nm 228 sh,
d. acidic NMR (D_2O) chemical shifts: 2.48 (s) 4.82 (s),
e. basic NMR (D_2O) chemical shifts: 2.30 (s) 4.68 (s),
f. mass spectral data:
M+ 171.0525 (100%)
153.0449 (54%)
125.0589 (32%)
112.0398 (74%),

produced by the controlled aerobic fermentation of an aqueous nutrient medium by *Streptoverticillium hiroshimense,* ATCC 39070 at a temperature of 26° to 30° C. for a least 70 hours at pH 6.0 to 8.0.

4,487,762

ANTIBIOTIC 5057B SUBSTANCE

Kusakabe Yoko, and Mizuno Taku, both of Tokyo, Japan, assignors to Kaken Chemical Co. Ltd., Japan

PCT No. PCT/JP81/00320, § 371 Date Jul. 13, 1982, § 102(e) Date Jul. 13, 1982, PCT Pub. No. WO82/01707, PCT Pub. Date May 27, 1982
Pub. Date Nov. 6, 1981, Ser. No. 403,491
Claims priority, application Japan, Nov. 13, 1980, 55-158856
Int. Cl.³ A61K *35/74;* C12P *1/06*
U.S. Cl. 424—120 2 Claims

1. A new antibiotic 5057B which is itself an acidic substance or the sodium salt thereof which, as the sodium salt, has the following physiochemical properties:
(1) Colorless needles
(2) Melting point: 143°–145° C.
(3) Elementary analysis (Found %): C, 59.96; H, 9.03; O, 27.60; Na, 3.41.
(4) Specific rotation: $[\alpha]_D^{25} = +5.5°$ (C 1, $CHCl_3$)
(5) Maximum absorption in ultraviolet absorption spectrum: λ_{max}^{MeOH} ($E_{1cm}^{1\%}$) 290 nm (0.88)
(6) Characteristic absorption (cm^{-1}) in infrared absorption spectrum (taken with the potassium bromide tablet: 3480, 3000, 2970, 2812, 1719, 1645, 1595, 1465, 1385, 1160, 1100, 1035, 980
(7) Solubility: soluble in methanol, ethanol, ethyl acetate, chloroform, ether, acetone, and benzene and so forth; insoluble in water
(8) Color reaction: positive in the 2,4-dinitrophenylhydrazine reaction; negative in the ninhydrin reaction and the vanilline-sulfuric acid reaction; colors with I_2 gas.

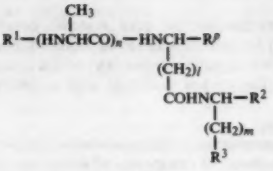
4,487,763

PEPTIDE, PROCESS FOR PREPARATION THEREOF AND USE THEREOF

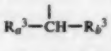
Yoshihiko Kitaura, Sakurai; Osamu Nakaguchi, Shiroyamacho; Keiji Hemmi; Matsuhiko Arutani, both of Suita; Hidekazu Takeno, Tenri; Satoshi Okada, Takatsuki; Hirokazu Tanaka, and Masashi Hashimoto, both of Takarazuka, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Division of Ser. No. 193,453, Oct. 3, 1980, Pat. No. 4,354,966.
This application Jul. 28, 1982, Ser. No. 402,440
Claims priority, application United Kingdom, Oct. 11, 1979, 7935401; Oct. 15, 1979, 7935730; Oct. 17, 1979, 7936000; Mar. 28, 1980, 8010459
The portion of the term of this patent subsequent to Oct. 19, 1999, has been disclaimed.
Int. Cl.³ C07C *103/52;* A61K *37/02*
U.S. Cl. 424—177 14 Claims

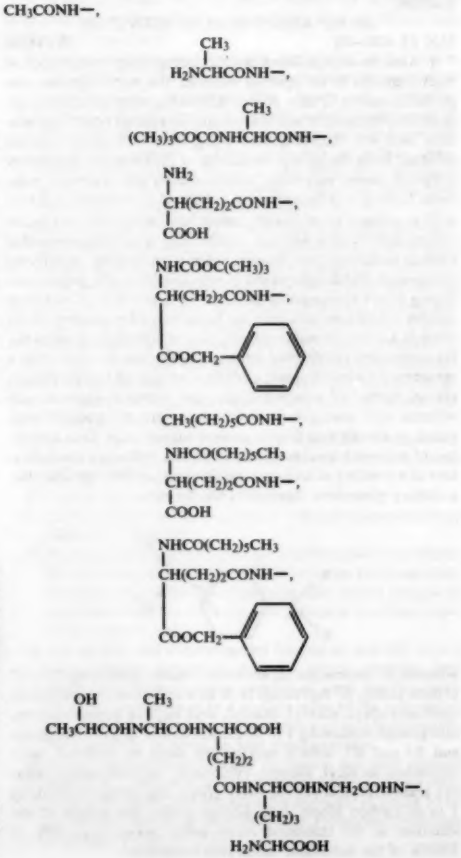
1. A compound of the formula or its pharmaceutically acceptable salt:



wherein
R^1 is hydrogen or acyl selected from 2-acetoxypropionyl, 2-hydroxypropionyl, t-butoxycarbonyl, heptanoyl and benzyloxycarbonyl;
R^2 is carboxy or protected carboxy or a group of the formula: —COHN-R^2_a wherein R^2_a is carboxy(lower)alkyl or protected carboxy(lower)alkyl;
R^3 is a group of the formula:



wherein R^3_a is hydrogen, amino, protected amino or acylamino selected from



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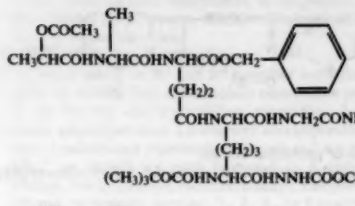
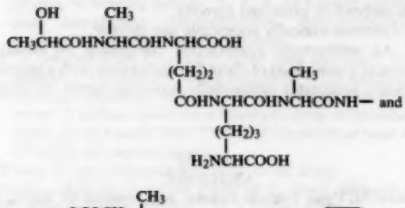
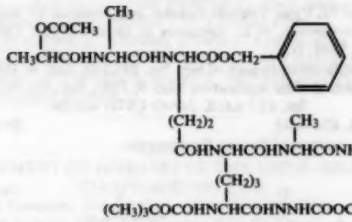
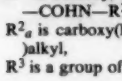






$R^3{}_b$ is carboxy or protected carboxy;
R^p is carboxy, protected carboxy, carbamoyl;
l is an integer 2,
m is an integer 3 and
n is an integer 0 to 1, provided that,
when
R^1 is hydrogen or acyl as defined above,
R^2 is carboxy, protected carboxy or a group formula: —COHN—$R^2{}_a$ wherein
$R^2{}_a$ is carboxy(lower)alkyl or protected carboxy(lower-)alkyl,
R^3 is a group of the formula:



wherein
$R^3{}_a$ is amino or protected amino,
$R^3{}_b$ is carboxy or protected carboxy, then
R^p is carbamoyl,
when
R^1 is hydrogen or acyl as defined above,
R^2 is carboxy, protected carboxy or a group of the formula: —CONHR$^2{}_a$ wherein $R^2{}_a$ is carboxy(lower)alkyl or protected carboxy(lower)alkyl,
R^p is carboxy, or protected carboxy, then
R^3 is a group of the formula:

wherein $R^3{}_a$ is hydrogen or acylamino as defined above and $R^3{}_b$ is carboxy or protected carboxy, and
when
R^p is carbamoyl and n is an integer 1, then R^1 is acyl as defined above.

4,487,764
NEW PEPTIDES AND A PROCESS FOR THEIR PREPARATION

Wolfgang König, Hofheim am Taunus; Rolf Geiger, Frankfurt am Main; Rainer Obermeier, Hattersheim am Main, and Hubert Müllner, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 23, 1982, Ser. No. 443,900
Claims priority, application Fed. Rep. of Germany, Nov. 25, 1981, 3146598
Int. Cl.³ A61K *37/00;* **C07C** *103/52*
U.S. Cl. 424—177 **10 Claims**

1. A peptide of the formula

$$B_1—B_2—A_1—A_2—X,$$

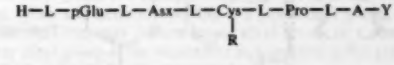
wherein
B_1 is in the L- or D- configuration and is arginine, lysine, or lysine which is acylated by a protective group of the urethane type,
B_2 is arginine or lysine,
A_1 is in the L- or D- configuration and is phenylalanine, tyrosine, or tryptophan,
A_2 is phenylalanine, tyrosine, or tryptophan, and
X is glutamine, glycine, proline, or arginine, or is an ester of such an amino acid with an aliphatic alcohol having 1–6 carbon atoms.

4,487,765
PEPTIDES

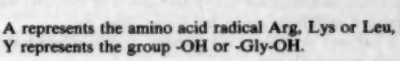
David de Wied, Bilthoven, Netherlands, assignor to Akzo N.V., Arnhem, Netherlands

Filed Oct. 17, 1983, Ser. No. 542,774
Claims priority, application Netherlands, Oct. 13, 1982, 8203949; Dec. 17, 1982, 8204881
Int. Cl.³ A61K *37/00;* **C07C** *103/52*
U.S. Cl. 424—177 **4 Claims**

1. A peptide having the general formula:



or a functional derivative thereof, wherein
R represents



A represents the amino acid radical Arg, Lys or Leu, and
Y represents the group -OH or -Gly-OH.

4,487,766
GROWTH STIMULANTS AND COMPOSITIONS CONTAINING SAME

Walter J. Mach, Kirchseon, Fed. Rep. of Germany, assignor to Lohmann Tierernahrung GmbH, Cuxhaven, Fed. Rep. of Germany

Filed Feb. 23, 1983, Ser. No. 469,129
Claims priority, application Fed. Rep. of Germany, Feb. 26, 1982, 3206911
Int. Cl.³ C07H *1/00, 37/00;* **A61K** *31/715*
U.S. Cl. 424—180 **13 Claims**

1. Process for producing a growth-promoting composition consisting of a water-soluble acid carbonization material in the form of decationized alkali salts, said process comprising the successive steps of:

(1) treating the carbonization product of a naturally-occurring lignin material with an aqueous alkaline solution;
(2) removing and discarding any suspended matter from the resulting solution;
(3) decationizing the solution of step (2) by adjusting the pH of the solution until it is weakly acidic;
(4) treating the decationized solution with an amount of a trace metal salt solution sufficient to partially inhibit the catabolic activity of the carbonization product of lignin, and
(5) drying the resulting reaction mixture at a temperature of at most about 75° C.

10. A growth-inducing composition containing as the active ingredient the product produced by the process of claim **1**.

11. A food or feed additive composition for promoting the growth of aminals to which it is administered comprising a growth-inducing quantity of the composition of claim **10** together with an animal feed.

4,487,767

7-[AMINO OR CARBOXY SUBSTITUTED OXYIMINO]-3-[AMINO OR ALKOXY SUBSTITUTED HETEROCYCLIC THIOMETHYL] CEPHALOSPORIN DERIVATIVES

Takao Takaya, Kawanishi; Takashi Masugi, Toyonaka; Hisashi Takasugi, Osaka, and Hiromu Kochi, Sakai, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

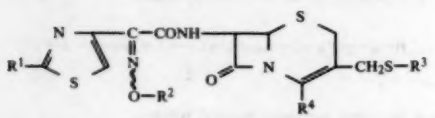
Division of Ser. No. 71,302, Aug. 30, 1979, Pat. No. 4,341,775, which is a continuation-in-part of Ser. No. 941,660, Sep. 12, 1978, Pat. No. 4,220,761. This application May 19, 1982, Ser. No. 379,729

Claims priority, application United Kingdom, Sep. 11, 1978, 36399/78; Mar. 13, 1979, 7908799; Mar. 26, 1979, 7910499

Int. Cl.[3] **A61K** *31/545;* **C07D** *501/56*

U.S. Cl. 424—246 **16 Claims**

1. A compound of the formula:



wherein

R^1 is amino or protected amino,

R^2 is amino(lower)alkyl, protected amino(lower)alkyl, carboxy(lower)alkyl, esterified carboxy(lower)alkyl,

R^3 is amino(lower)alkyltetrazolyl or lower alkoxycarbonylamino(lower)alkyltetrazolyl, hydroxy(lower)alkyltetrazolyl, amino(lower)alkylthiadiazolyl, lower alkoxycarbonylamino(lower)alkylthiadiazolyl or triazolyl substituted with both amino and lower alkyl, and

R^4 is carboxy or a protected carboxy, and its pharmaceutically acceptable salt.

16. A pharmaceutically antibacterial composition comprising an effective amount of the compound of claim **1** in association with a pharmaceutically acceptable, substantially non-toxic carrier or excipient.

4,487,768

CEPHEM COMPOUNDS

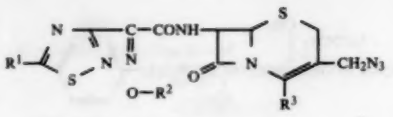
Takao Takaya, Kawanishi; Takashi Masugi, Ikeda; Hisashi Takasugi, Hamaguchinishi, and Kenzi Miyai, Kawanishi, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Dec. 22, 1982, Ser. No. 452,301

Int. Cl.[3] **A61K** *31/545;* **C07D** *501/46*

U.S. Cl. 424—246 **3 Claims**

1. A compound of the formula:



wherein

R^1 is amino or protected amino,

R^2 is carboxy(lower)alkyl or protected carboxy(lower)alkyl, and

R^3 is carboxy or protected carboxy,

and a pharmaceutically acceptable salt thereof.

3. An antibacterial composition comprising an effective amount of a compound of claim **1** in association with a pharmaceutically acceptable substantially non-toxic carrier or excipient.

4,487,769

AMIDINES

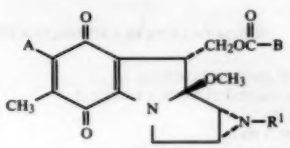
Dolatrai M. Vyas; Takushi Kaneko, and Terrence W. Doyle, all of Fayetteville, N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Continuation-in-part of Ser. No. 385,149, Jun. 4, 1982, abandoned. This application May 9, 1983, Ser. No. 492,903

Int. Cl.[3] **A61K** *31/40;* **C07D** *403/04*

U.S. Cl. 424—246 **39 Claims**

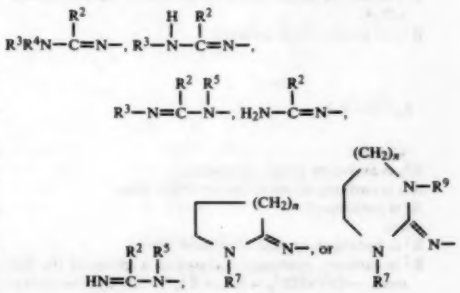
1. A compound having the formula:



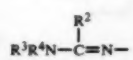
Formula I

wherein:

A is amino, methoxy, hydroxy, (1-lower alkyl-2(1H)-pyridinylidene)amino, or a group of the formula



B is amino or the amidino group of the formula



and at least one of A and B is one of the specified groups other than amino, methoxy, or hydroxy,

n is the integer of 0, 1, 2, or 3,

R^1 is hydrogen, lower alkyl, lower alkanoyl, benzoyl or substituted benzoyl wherein said substituent is lower alkyl, lower alkoxy, halo, amino, or nitro,

R^2 is hydrogen, lower alkyl, phenyl, lower alkylphenyl, lower alkoxyphenyl, halophenyl, aminophenyl, nitrophenyl, thienyl, furyl, cyano, dilower alkylamino, lower alkoxy, or lower alkylthio,

R^3 is lower alkyl, or lower alkoxy,

R^4 is lower alkyl, or R^3 and R^4 together with the nitrogen atom to which they are attached constitutes pyrrolidine, 2-, or 3-lower alkylpyrrolidine, piperidine, 2-, 3-, or 4-lower alkylpiperidine, 2,6-dilower alkylpiperidine, piperazine, 4-substituted piperazine (wherein said 4-substituent is alkyl, or carbalkoxy each having 1 to 8 carbon atoms, phenyl, methylphenyl, methoxyphenyl, halophenyl, nitrophenyl, or benzyl), azepine, 2-, 3-, 4-, or 5-lower alkylazepine, morpholine, thiomorpholine, thiomorpholine-1-oxide, or thiomorpholine-1, 1-dioxide,

R^5 is selected from C_{1-18} alkyl other than tert.-alkyl, C_{1-18} alkenyl, C_{1-18} alkynyl, C_{1-18} haloalkyl, C_{1-18} hydroxyalkyl, C_{4-8} cycloalkyl, or aryl or lower aralkyl, each having up to 12 carbon atoms or a heteroalicyclic or heteroaromatic group having from 3 to 8 ring members at least two of which are carbon atoms,

R^7 and R^9 are independently H or lower alkyl

wherein each of the aforesaid lower alkyl, lower alkanoyl and lower alkoxy groups contains 1 to 6 carbon atoms.

39. The method of inhibiting growth of a mammalian tumor which comprising systemic administration to a mammal bearing a tumor, a substantially non-toxic antitumor effective dose of a compound of claim **1**.

4,487,770

TREATMENT OF DISEASES OF THE LIVER, KIDNEY, COLON AND RECTUM

Hiroshi Enomoto, Nagaokakyo; Akira Nomura, Hirakata; Yoshiaki Aoyagi, Otsu, and Fusao Ueda, Shiga, all of Japan, assignors to Nippon Shinyaku Co., Ltd., Japan

Filed Aug. 26, 1982, Ser. No. 411,593

Claims priority, application Japan, Sep. 25, 1981, 56-152471

Int. Cl.[3] **A61K** *31/53*

U.S. Cl. 424—249 **5 Claims**

1. A method of treatment of disorders of hepatic cellular function in mammals including humans, which comprises administering to the patient a therapeutically effective cytoprotective amount of 2,4-diamino-6-(2', 5'-dichlorophenyl)-s-triazine maleate sufficient to overcome said disorders.

4,487,771

C-3 SUBSTITUTED 1,4-BENZODIAZEPINES AND PHARMACEUTICAL UTILIZATION THEREOF

Alessandro Baglioni, Rome, Italy, assignor to Medosan Industrie Biochimiche Riunite, S.p.A., Albano Laziale, Italy

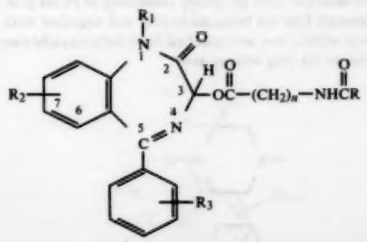
Filed Mar. 20, 1984, Ser. No. 591,408

Claims priority, application Italy, Mar. 23, 1983, 47972 A/83

Int. Cl.[3] **A61K** *31/55*; **C07D** *243/24*

U.S. Cl. 424—244 **17 Claims**

1. A 1,4-benzodiazepine compound having the formula



(I)

wherein R is selected from the group comprising a lower alkyl with up to 5 carbon atoms, alkoxy with up to 4 carbon atoms, branched or straight chain; R_1 is selected from the group comprising H, $—CH_3$, $—CH_2CH_2N(C_2H_5)_2$; R_2 and R_3 are each individually selected from the group comprising H, Br, Cl, F trifluoromethyl, NO_2; n is a whole integer from 1 to 5.

17. A method for the treatment of psychosomatic and psychic disturbances comprising administering an effective amount of a 1,4-benzodiazepine compound having the formula as defined in claim **1**.

4,487,772

CARBOSTYRIL DERIVATIVES AND THEIR SALTS

Michiaki Tominaga; Yung-hsiung Yang; Hidenori Ogawa, and Kazuyuki Nakagawa, all of Tokushima, Japan, assignors to Otsuka Pharmaceutical Co. Ltd., Tokyo, Japan

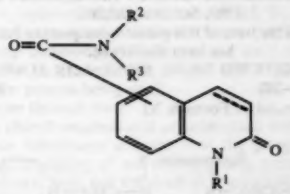
Filed Feb. 16, 1982, Ser. No. 348,709

Claims priority, application Japan, Feb. 17, 1981, 56-22437; Apr. 15, 1981, 56-57732; Aug. 12, 1981, 56-127145

Int. Cl.[3] **C07D** *401/06*; **A61K** *31/495*

U.S. Cl. 424—250 **34 Claims**

1. A arbostyril derivative or a pharmaceutically acceptable salt thereof said derivative being represented by the formula (1),



(1)

wherein R^1 is a hydrogen atom, a lower alkyl group, a lower alkenyl group, a lower alkynyl group or a phenyl-lower lower alkyl group; R^2 and R^3 may form, together with the adjacent nitrogen atom and further with an additional nitrogen atom, a 6-membered saturated heterocyclic ring which may have a lower alkyl group or a phenyl-lower alkyl group as the substituent; when said heterocyclic ring is a piperazinyl group, said piperazinyl ring may have a lower alkyl group or a phenyl-lower alkyl group as the substituent at 4-position in the piperazinyl ring, further said piperazinyl group may have, as the substituent at 4-position, a lower alkenyl group, a lower alkynyl group, a cycloalkyl group, a cycloalkyl-lower alkyl group, a lower alkanoyl group, a lower alkanoyl-lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyl-lower alkyl group, a furoyl group, a lower alkylsulfonyl group, a substituted lower alkyl group (having one substituent selected from the group consisting of a cyano group, a benzoyloxy group (which may have 1 to 3 lower alkoxy groups on the phenyl ring), a hydroxy group, a lower alkanoyloxy group, a halogen atom and a carbamoyl group), a phenoxy-lower alkyl group (which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a halogen atom, a lower alkoxy group and a lower alkyl group, or said phenoxy-lower alkyl group may have, on the phenyl ring, a lower alkylenedioxy group as the substituent), a phenyl-lower alkyl group (which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkyl group, a lower alkoxy group, a halogen atom, a nitro group, an amino group, a lower alkanoylamino group and a lower alkylthio group, or said phenyl-lower alkyl group may have, on the phenyl ring, a lower alkylenedioxy group as the substituent), a benzoyl group (which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkyl group, a lower alkoxy group, a halogen atom, a nitro group and a cyano group, or said benzoyl group may have, on the phenyl ring, a lower alkylenedioxy group as the substituent), a phenyl-sulfonyl group (which may have, on the phenyl ring, 1 to 3 lower alkyl groups as the substituents), a benzoyl-lower alkyl group (which may have, on the phenyl ring, 1 to 3 substit-

uents selected from the group consisting of a halogen atom, a hydroxy group, a lower alkyl group, a lower alkoxy group and a lower alkanoylamino group), a phenyl-lower alkenyl-carbonyl group (which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a halogen atom and a lower alkoxy group), or a phenyl-lower alkanoyl group (which may have, on the phenyl ring, 1 to 3 lower alkoxy groups as the substitutents); the carbon-carbon bond between 3- and 4-positions in the carbostyril skeleton being a single or double bond.

34. A cardiotonic composition containing an effective amount a carbostyril derivative of claim **1** or one of its pharmaceutically acceptable salts as the active ingredient.

4,487,773
1,2,4-TRIAZOL-3-ONE ANTIDEPRESSANTS

Davis L. Temple, Jr., and Walter G. Lobeck, Jr., both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

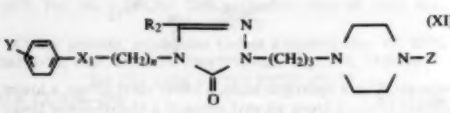
Continuation-in-part of Ser. No. 351,834, Feb. 24, 1982, abandoned, which is a continuation-in-part of Ser. No. 244,464, Mar. 16, 1981, Pat. No. 4,338,317. This application Jun. 29, 1983, Ser. No. 509,266

The portion of the term of this patent subsequent to Jul. 6, 1999, has been disclaimed.

Int. Cl.[3] **C07D** *249/08, 403/04;* **A61K** *31/495*

U.S. Cl. 424—250 **29 Claims**

1. A compound of Formula XI



(XI)

wherein

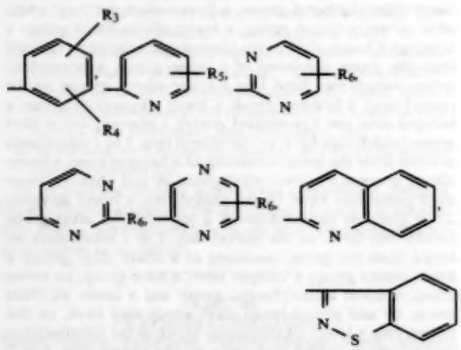
n is 2–4;

R_2 is hydrogen or lower alkyl;

X_1 is oxygen or a direct bond;

Y is hydrogen, halogen, lower alkoxy or CF_3 with the proviso that when Y is hydrogen, n cannot be 2, R_2 cannot be ethyl, X_1 cannot be oxygen and Z cannot be phenyl having a mono halogen substituent;

Z is benzyl or a radical selected from the group



wherein

R_3 is hydrogen or halogen;

R_4 is halogen or CF_3;

R_5 is hydrogen, halogen or cyano;

R_6 is hydrogen or halogen;

or a pharmaceutically acceptable acid addition salt thereof.

4,487,774
ISOCHROMANS

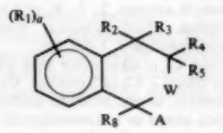
John M. McCall, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 026,719, Apr. 4, 1979, , which is a continuation-in-part of Ser. No. 847,350, Oct. 31, 1977, abandoned. This application Apr. 21, 1982, Ser. No. 370,327

Int. Cl.[3] **A61K** *31/445;* **C07D** *405/06, 405/14*

U.S. Cl. 424—256 **63 Claims**

1. Compounds having the formula



Ib

wherein

R_1 is the same or different and is selected from the group consisting of alkyl of one through three carbons, inclusive, alkoxy of one through three carbons, inclusive, trihaloalkyl of one or two carbons, hydroxy, halo, trihaloalkoxy of one or two carbons and o-methylenedioxy with the proviso that at least one R_1 is hydroxy, alkoxy or o-methylenedioxy;

a is one through three;

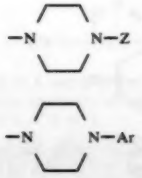
R_2 through R_5 are the same or different and are selected from the group consisting of hydrogen, alkyl of one through three carbons, inclusive, hydroxy, alkoxy of one through three carbons, inclusive; phenyl; halo; cycloalkyl of three through six carbons when R_2 and R_3 or R_4 and R_5 are taken together with the carbon to which they are attached; cycloalkyl of four through seven carbons when R_2 and R_4 are taken together with the carbons to which they are attached; and cycloalkyl of five or six carbons, with the overall provisos that no more than one ring may be attached to any one carbon and that at least two of R_2 through R_5 are hydrogen,

R_8 is alkyl of one through three carbons, inclusive, hydrogen, or phenyl unsubstituted or substituted with a maximum of three substituents selected from the group consisting of alkyl of one through three carbons, inclusive, halo, alkoxy of one through three carbons, inclusive, and trihaloalkyl of one to two carbons;

W is oxygen; and A is selected from the group consisting of:

(i) $-(CH_2)_nNR_9R_{10}$, wherein n is one to five with the proviso that when n is one or two, R_2 through R_5 cannot all be hydrogen at the same time;

(ii) $-(CH_2)_m(OCH_2CH_2)_q-NR_{21}R_{22}$, wherein m and q are each one to three, and $NR_{21}R_{22}$ is selected from the group consisting of $-NHCH_2CH_2Ar$; $NR_{21}'R_{22}'$ wherein R_{21}' and R_{22}' can be the same or different and are selected from the group consisting of H, alkyl of one through four carbons, inclusive, and together with the N to which they are attached form heterocyclic rings of four to six ring atoms; and



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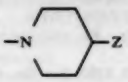
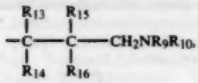
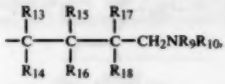


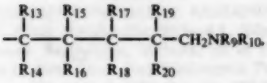
morpholino and NR_9R_{10}.



(iii)



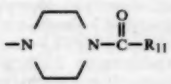
(iv)

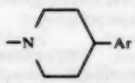


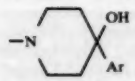
(v)

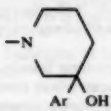
wherein

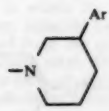
NR_9R_{10} is a heterocyclic amine selected from the group consisting of:

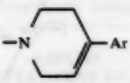


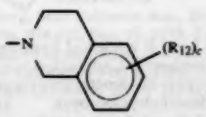












and

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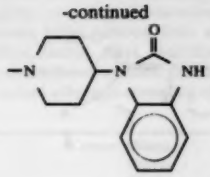


wherein

R_{11} is alkyl of one through four carbons, inclusive, 2-furyl, Ar, alkoxy of one to three carbon atoms, inclusive;

Z is selected from the group consisting of pyridyl, pyrimidinyl, triazinyl, pyrazinyl, pyridazinyl, pyrrolyl, imidazolyl, pyrazolyl, furyl, tetrazyl, oxazolyl, quinoxalinyl, and quinazolinyl, wherein each member of the group can be unsubstituted or substituted with one or two substituents selected from the group consisting of alkyl of one through three carbons, inclusive, alkoxy of one through three carbons, inclusive, hydroxy, halo, and haloalkyl of one through three carbons, inclusive;

R_{12} is alkyl or alkoxy of one through three carbons, inclusive, hydroxy, halo, or trihalomethyl; R_{13} through R_{20} may be the same or different and are selected from the group consisting of hydrogen and alkyl of from 1 to 2 carbon atoms, inclusive, at least one of R_{13} through R_{20} when present being alkyl;

c is zero through two;

Ar is phenyl unsubstituted or substituted with one through three substituents selected from the group consisting of alkyl or alkoxy of one through three carbons, inclusive, hydroxy, halo, and trihaloalkyl or trihaloalkoxy of one or two carbons and pharmaceutically acceptable acid addition salts thereof.

4,487,775

METHOD OF TREATING TRANSPLANTED TUMORS AND CANCEROUS CACHEXIA WITH QUINOLINIC DIHYDRAZIDE

Joseph Gold, 127 Edgemont Dr., Syracuse, N.Y. 13214

Division of Ser. No. 940,330, Sep. 7, 1978, abandoned, which is a continuation-in-part of Ser. No. 756,647, Jan. 4, 1977, abandoned, which is a continuation of Ser. No. 565,103, Apr. 4, 1975, abandoned, which is a continuation of Ser. No. 378,665, Jul. 12, 1973, abandoned, which is a division of Ser. No. 250,883, May 8, 1972, abandoned. This application Oct. 26, 1982, Ser. No. 436,781

Int. Cl.[3] **A61K** *31/455, 31/655*

U.S. Cl. 424—266 **5 Claims**

1. A method of treating a transplanted Walker 256 carcinoma tumor in a quadruped so afflicted which comprises internally administering thereto quinolinic dihydrazide in an effective dosage sufficient to inhibit the growth of said tumor.

4,487,776

AZOLYL-PHENOXY-TETRAHYDROFURAN-2-YLIDENE-METHANES, A PROCESS FOR THEIR PREPARATION, AND ANTIMICROBIAL AGENTS WHICH CONTAIN THESE SUBSTANCES

Hans-Ludwig Elbe, Wuppertal; Manfred Jautelat; /u/ chel BUM, both of Burscheid; Klaus Schaller, and Manfred Piempel, both of Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

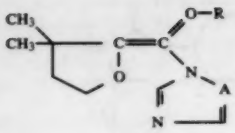
Filed Jan. 27, 1983, Ser. No. 461,369

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1982, 3204795

Int. Cl.[3] **A61K** *31/41, 31/415;* **C07D** *249/08, 233/56*

U.S. Cl. 424—269 **17 Claims**

1. An azolyl-phenoxy-tetrahydrofuran-2-ylidene-methane of the formula



(I)

in which

A represents a nitrogen atom or the CH group and

R represents phenyl which is optionally monosubstituted to trisubstituted by identical or different substituents, selected from halogen, alkyl having 1 to 4 carbon atoms, alkoxy and alkylthio, each having 1 to 2 carbon atoms, halogenoalkyl, halogenoalkoxy and halogenoalkylthio, each having 1 to 2 carbon atoms and 1 to 5 identical or different halogen atoms, alkoxycarbonyl having 1 to 4 carbon atoms in the alkyl part, nitro, cyano, or phenoxy or phenyl which is optionally substituted by halogen and/or by alkyl having 1 to 2 carbon atoms.

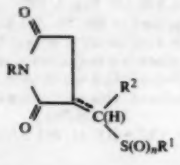
15. A method for combating mycoses in warm-blooded animals which comprises administering to said animals an antimycotically effective amount of a compound of claim 1 either alone, in admixture with an inert pharmaceutically suitable excipient or in the form of a medicament.

4,487,777
N-PHENYL-2-THIOMETHYLSUCCINIMIDES, AND N-PHENYL-2-THIOMETHENYL SUCCINIMIDES, AND FUNGICIDAL USE THEREOF

David M. Spatz, Fairfax, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Sep. 29, 1981, Ser. No. 297,800
Int. Cl.[3] A01N *37/32*; A61K *31/40*; C07D *207/40*
U.S. Cl. 424—274 12 Claims

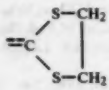
1. A compound having the formula



wherein R is phenyl or phenyl substituted with 1 to 3 of the same or different substituents selected from fluoro, chloro, bromo, iodo, nitro, and trihalo substituted methyl;

R^1 is lower alkoxycarbonylalkylene wherein said alkoxy moiety and said alkylene moiety independently have 1 through 6 carbon atoms;

R^2 is hydrogen or R^1 and R^2 together with the carbon atom to which they are joined form a sulfur heterocycle having the formula



n is 0, 1, 2, or 3, with the proviso that when R^1 and R^2 together with the carbon atom to which they are joined form said sulfur heterocycle then n is 0; and

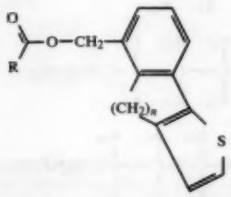
C≡C represents either a saturated single bond or an unsaturated double bond.

4,487,778
INSECTICIDAL ESTERS DERIVED FROM BENZOCYCLOALKANE-THIOPHENEMETHYL COMPOUNDS

Ernest L. Plummer, Yardley, Pa., assignor to FMC Corporation, Philadelphia, Pa.

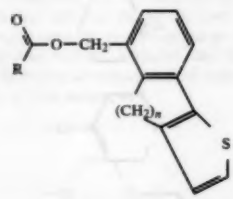
Filed Jan. 27, 1983, Ser. No. 461,420
Int. Cl.[3] A01N *43/12, 53/00*; C07D *333/80*
U.S. Cl. 424—275 9 Claims

1. Insecticidal benzocycloalkanethiophenemethyl esters of the formula



wherein n is 2 or 3 and R is selected from the group consisting of 3-(2,2-dihaloethenyl)-2,2-dimethylcyclopropyl; 3-(cyclopentylidenemethyl)-2,2-dimethylcyclopropyl; 3-(2-methyl-1-propenyl)-2,2-dimethylcyclopropyl; 3-(1,2-dibromo-2,2-dichloroethyl)-2,2-dimethylcyclopropyl; 3-(1,2,2,2-tetrabromoethyl)-2,2-dimethylcyclopropyl; 3-(2-chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropyl; 3-(3-chloro-2,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropyl; 3-(2,3-dichloro-3,3-difluoro-1-propenyl)-2,2-dimethylcyclopropyl; 2,2,3,3-tetramethylcyclopropyl; 2,2-dichloro-3,3-dimethylcyclopropyl; 4-chloro-α-(1-methylethyl)phenylmethyl; 4-difluoromethoxy-α-(1-methylethyl)phenylmethyl; 3-(1,3-butadienyl)-2,2-dimethylcyclopropyl; 2,2-dimethyl-3-(oximinomethyl)cyclopropyl; 2-(2chloro-α,α,α-trifluoro-p-toluidino)-3-methylbutyl; 3-(2,3,4,5-tetrahydro-2-oxothien-3-ylidenemethyl)-2,2-dimethylcyclopropyl; 2,2-dichloro-1-(4-ethoxyphenyl)cyclopropyl; 4-halo-α-(1-cyclopropyl)phenylmethyl; spiro[2,2-dimethylcyclopropane-1,1′-[1H]-indene-3-yl; spiro[3-(2,2-dichloroethenyl)cyclopropane-1,1′-cyclohexane]-2-yl; spiro[3-(2,2-dichloroethenyl)cyclopropane-1,1′-cyclobutane]-2-yl; 3-phenyl-2,2-dimethylcyclopropyl; 3-(4-halophenyl)-2,2-dimethylcyclopropyl; 3-(4-methoxyphenyl)-2,2-dimethylcyclopropyl; 3-(4-ethoxyphenyl)-2,2-dimethylcyclopropyl; and 3-(3,4-methylenedioxyphenyl)-2,2-dimethylcyclopropyl.

9. A method of controlling insects or acarids which comprises applying to the locus where control is desired an insecticidally or acaricidally effective amount of at least one compound of the formula



wherein n is 2 or 3 and R is selected from the group consisting of 3-(2,2-dihaloethenyl)-2,2-dimethylcyclopropyl; 3-(cyclopentylidenemethyl)-2,2-dimethylcyclopropyl; 3-(2-methyl-1-propenyl)-2,2-dimethylcyclopropyl; 3-(1,2-dibromo-2,2-dichloroethyl)-2,2-dimethylcyclopropyl; 3-(1,2,2,2-tetrabromoethyl)-2,2-dimethylcyclopropyl; 3-(2-chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropyl; 3-(3-chloro-

2,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropyl; 3-(2,3-dichloro-3,3-difluoro-1-propenyl)-2,2-dimethylcyclopropyl; 2,2,3,3-tetramethylcyclopropyl; 2,2-dichloro-3,3-dimethylcyclopropyl; 4-chloro-α-(1-methylethyl)phenylmethyl; 4-difluoromethoxy-α-(1-methylethyl)phenylmethyl; 3-(1,3-butadienyl)-2,2-dimethylcyclopropyl; 2,2-dimethyl-3-(oximinomethyl)-cyclopropyl; 2-(2-chloro-α,α,α-trifluoro-p-toluidino)-3-methylbutyl; 3-(2,3,4,5-tetrahydro-2-oxothien-3-ylidenemethyl)-2,2-dimethylcyclopropyl; 2,2-dichloro-1-(4-ethoxyphenyl)cyclopropyl; 4-halo-α-(1-cyclopropyl)phenylmethyl; spiro[2,2-dimethylcyclopropane-1,1'-[1H]-indene]-3-yl; spiro[3-(2,2-dichloroethenyl)cyclopropane-1,1'-cyclohexane]-2-yl; spiro[3-(2,2-dichloroethenyl)cyclopropane-1,1'-cyclobutane]-2-yl; 3-phenyl-2,2-dimethylcyclopropyl; 3-(4-halophenyl)-2,2-dimethylcyclopropyl; 3-(4-methoxyphenyl)-2,2-dimethylcyclopropyl; 3-(4-ethoxyphenyl)-2,2-dimethylcyclopropyl; and 3-(3,4-methylenedioxyphenyl)-2,2-dimethylcyclopropyl.

4,487,779

SUBSTITUTED PHENYL AMIDINOUREAS

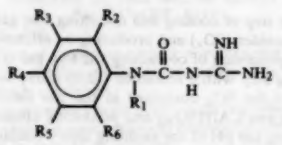
William L. Studt, Harleysville; Richard L. Riley, North Wales, and George H. Douglas, Malvern, all of Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.

Filed Jul. 6, 1981, Ser. No. 280,786

Int. Cl.³ C07C *127/19*; A61K *31/17*

U.S. Cl. 424—278 **14 Claims**

1. A compound according to the formula:



wherein:

R_1 is hydrogen or lower alkyl;

R_2 and R_6 may be the same or different and are lower alkyl, halo, lower alkoxy, nitro, haloloweralkyl, or lower alkylsulfonyl;

R_3, and R_5 may be the same or different and are hydrogen, hydroxy, lower alkoxy, arloweralkoxy, lower alkenyloxy, lower alkynyloxy, haloloweralkylacyloxy, or loweralkyl acyloxy; and R_4 is hydrogen; or

R_3 and R_4 together may be carbonyldioxy, methylenedioxy or ethylenedioxy and form a 5 or 6 membered heterocylic ring;

wherein, when R_4 is hydrogen, at least one of R_3 and R_5 is other than hydrogen;

and wherein:

arloweralkoxy means a lower alkoxy group substituted by phenyl or phenyl in which one or more of the phenyl hydrogens has been replaced by the same or different substituents selected from the group consisting of halo, lower alkyl, halo-lower alkyl, nitro, amino, lower alkanoyl, hydroxy, lower hydroxy, phenyl-lower alkoxy, lower alkanoyl, cyano, halo-lower alkoxy, and lower alkyl sulfonyl;

or a nontoxic pharmaceutically acceptable salt thereof.

4,487,780

METHOD OF TREATMENT OF RHEUMATOID ARTHRITIS

Israel H. Scheinberg, 5447 Palisades Ave., Bronx, N.Y. 10471

Division of Ser. No. 076,652, Sep. 18, 1979, Pat. No. 4,315,028, which is a continuation-in-part of Ser. No. 926,688, Jul. 21, 1978, abandoned. This application Feb. 5, 1982, Ser. No. 346,208

Int. Cl.³ A61K *31/30, 31/195*

U.S. Cl. 424—294 **16 Claims**

1. Method of treatment of rheumatoid arthritis comprising the step of administering to a patient with a rheumatoid arthritis treatment effective amount of a sulfhydryl compound selected from the group consisting of beta-monosubstituted cysteine, the substituent being selected from a first subgroup consisting of chloro, methyl, ethyl, hydroxymethyl and hydroxyethyl; beta-disubstituted cysteine, the substituents being selected from a second subgroup consisting of the pairs,

chloro,	chloro,
methyl,	chloro,
ethyl,	chloro,
methyl,	ethyl,
ethyl,	ethyl,
hydroxymethyl,	hydroxymethyl,
hydroxyethyl,	hydroxylethyl,
hydroxymethyl,	hydroxyethyl,
methyl,	hydroxymethyl,
methyl,	hydroxyethyl,
ethyl,	hydroxymethyl,
ethyl,	hydroxyethyl,
chloro,	hydroxymethyl, and
chloro,	hydroxyethyl;

alpha-substituted cysteine, the substituent being selected from a third subgroup identical with said first subgroup;

beta-monosubstituted, alpha-substituted cysteine, the substituents in both positions being selected from a fourth subgroup identical with the members of said first subgroup;

alpha-substituted, beta-disubstituted cysteine, the substituents being selected from a fifth subgroup consisting of the combinations of the members of said first subgroup with the members of said second subgroup;

an N-acetyl derivative of a member of said group of sulfhydryl compounds; and combinations of said compounds.

4,487,781

TRIHALOALLYL DERIVATIVES HAVING ANTI-FUNGAL ACTIVITIES

Yasuhiro Morisawa; Kiyoshi Konishi, and Mitsuru Kataoka, all of Hiromachi, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

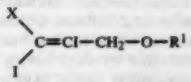
Continuation of Ser. No. 166,817, Jul. 8, 1980, abandoned. This application Aug. 23, 1982, Ser. No. 410,695

Claims priority, application Japan, Jul. 13, 1979, 54-89093; Sep. 14, 1979, 54-118118

Int. Cl.³ A01N *37/14*; C07C *69/96*

U.S. Cl. 424—301 **12 Claims**

1. An anti-fungal composition comprising an effective amount of an anti-fungal ingredient in admixture with a carrier or diluent, wherein the active ingredient is a compound of formula (Ia):



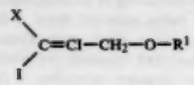
(Ia)

wherein:

X represents a bromine atom or an idine atom; and

R^1 represents an alkanoyl group having from 2 to 7 carbon atoms, a halogen-substituted alkanoyl group having from 2 to 4 carbon atoms, an alkoxy-carbonyl group having from 2 to 6 carbon atoms, a halogen-substituted alkoxy-carbonyl group having from 3 to 5 carbon atoms or an alkoxyalkoxycarbonyl group having a total of from 4 to 6 carbon atoms.

7. Compounds of formula (Ia):



(Ia)

wherein:

X represents a bromine atom or an iodine atom; and

R^1 represents an alkanoyl group having from 2 to 7 carbon atoms, a halogen-substituted alkanoyl group having from 2 to 4 carbon atoms, an alkoxycarbonyl group having from 2 to 6 carbon atoms, a halogen-substituted alkoxycarbonyl group having 3 to 5 carbon atoms or an alkoxyalkoxycarbonyl group having a total of from 4 to 6 carbon atoms.

4,487,782

TOPICAL TREATMENT OF NON-INFLAMMATORY ACNE

James A. Mezick, East Brunswick, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Mar. 26, 1982, Ser. No. 362,356
Int. Cl.³ A61K *31/19*
U.S. Cl. 424—317 **8 Claims**

1. The method of treating non-inflammatory acne which comprises applying 13-cis-retinoic acid topically to the affected area in a concentration effective for the treatment of acne.

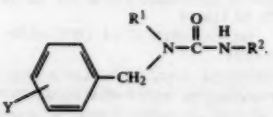
4,487,783

COMBATING FUNGI WITH NOVEL (THIO-)UREAS, AND NOVEL INTERMEDIATES THEREFOR

Klaus Grohe, Odenthal, and Volker Paul, Solingen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 9, 1982, Ser. No. 406,695
Claims priority, application Fed. Rep. of Germany, Aug. 19, 1981, 3132690
Int. Cl.³ C07C *127/15, 157/05;* A01N *9/12, 9/20*
U.S. Cl. 424—322 **9 Claims**

1. A urea of the formula



in which

Y is fluorine, trifluoromethyl, trifluoromethoxy, trifluoromethylthio, or 1,1,2-trifluoro-2-chlorethoxy

R^1 is a cycloalkyl radical which has 3 to 7 carbon atoms and is optionally substituted by alkyl having 1 to 4 carbon atoms, or a halogenoalkyl radical having 2 to 4 carbon atoms and 1 to 5 halogen atoms, and

R^2 is an alkyl radical having 1 to 4 carbon atoms, a cycloalkyl radical having 3 to 7 carbon atoms or a phenyl or naphthyl radical optionally substututed by halogen, C_1 to C_4 alkyl, halogenoalkyl having 1 or 2 carbon atoms and 3 to 5 halogen atoms, or halogenoalkoxy or halogenothioalkoxy each having 1 to 5 carbon atoms and up to 5 halogen atoms.

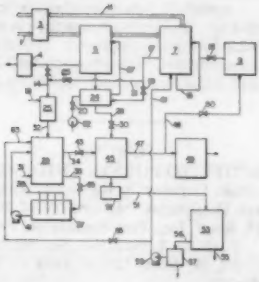
8. A method of combating fungi comprising applying to the fungi, or to a habitat thereof, a fungicidally effective amount of a compound according to claim 1.

4,487,784

LIMESTONE-GYPSUM FLUE GAS DESULFURIZATION PROCESS

Hiroshi Kuroda; Tsukasa Nishimura; Taiki Hashimoto; Masakatsu Nishimura; Osamu Kanda, and Shigeru Nozawa, all of Kure, Japan, assignors to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 22, 1982, Ser. No. 350,598
Int. Cl.³ C01F *11/46;* C01B *17/00*
U.S. Cl. 423—555 **31 Claims**



5. A limestone-gypsum flue gas desulfurization process comprising:

a cooling step of cooling and dedusting flue gas containing sulfur oxides (SO_x) and producing an effluent;

an absorption step of contacting the flue gas cooled in said cooling step with a limestone (lime) slurry to absorb and remove the SO_x contained in the gas thereby forming $CaSO_3$ and $CA(HSO_3)_2$ and producing cleaned gas;

controlling the pH of the resulting slurry containing $CaSO_3$ and $Ca(HSO_3)_2$ formed in said absorption step to less than 5;

an oxidation step of contacting the resulting slurry from said pH-adjusting step with air to oxidize it and thereby form gypsum wherein the air is supplied in an amount of 1.5 to 3 times the theoretical amount of air;

a liquid-separation step of concentrating the resulting slurry containing gypsum from said oxidation step to produce a concentrated gypsum slurry and clarified water;

a centrifugal separation step of separating gypsum from the concentrated gypsum slurry to produce gypsum and a filtrate containing fine particles of gypsum;

treating the clarified water separated from the gypsum slurry by adjusting the pH to 1.5 or less and heating to at least 60° C. to decompose dithionic ions.

4,487,785

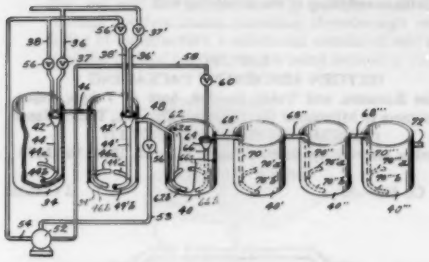
CONTINUOUS PROCESS FOR THE FERMENTATION OF MUST TO PRODUCE WINE OR ETHANOL

Jacques S. Epchtein, Avenida Alexandre Petta, 953, Vila Resende 13400 Piracicaba, Sao Paulo, Brazil

Filed Oct. 27, 1982, Ser. No. 436,970
Claims priority, application Brazil, Oct. 30, 1981, 8107043
Int. Cl.³ C12G *1/00, 2/00;* C12P *7/06*
U.S. Cl. 426—15 **7 Claims**

1. A process for the continuous fermentation of must to produce wine in a plurality of serially-connected fermentation vats comprising fermenting a must-containing medium in an initial fermentation zone in a plurality of relatively large fermentation vats, transferring the initially fermented must-containing medium to a final fermentation zone and completing the fermentation of the must-containing medium in said final fermentation zone in a plurality of fermentation vats having a size smaller than the size of the fermentation vats employed in said initial fermentation zone, the fermentation vats in said initial fermentation zone having a volume capacity equal to 60

to 80 percent of the total volume of must-containing fermentation medium being fermented in both the initial and final fermentation zones and the fermentation vats in said final fermentation zone having a volume capacity equal to 20 to 40 percent of the total volume of said must-containing fermentation medium being fermented.



4,487,786

STARCH ENROBING PROCESS FOR COATING FROZEN FOOD

Richard C. Junge, Portland, Oreg., assignor to Lamb-Weston, Inc., Portland, Oreg.

Filed Oct. 22, 1982, Ser. No. 435,914
Int. Cl.³ A23L *3/00*
U.S. Cl. 426—302 **14 Claims**

1. A method of preparing a starch enrobing slurry for forming a film-like coating on the outer surface of a frozen food product, which comprises:

forming an aqueous starch slurry including wheat flour and a high amylose starch material containing not less than 50 percent by weight of amylose,

the slurry containing between 2 to 15 percent by weight of the wheat flour and between 15 to 45 percent by weight of the starch material and having a viscosity of between 500 and 2500 SSU; and

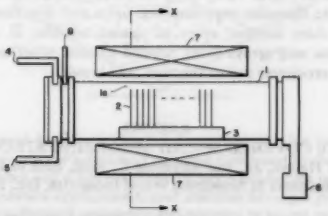
adding an edible acid to adjust the pH to between 2 and 5.5.

4,487,787

METHOD OF GROWING SILICATE GLASS LAYERS EMPLOYING CHEMICAL VAPOR DEPOSITION PROCESS

Yoshimi Shioya, Yokohama, and Mikio Takagi, Kawasaki, both of Japan, assignors to Fujitsu Limited, Japan

Continuation of Ser. No. 215,629, Dec. 12, 1980, abandoned.
This application Oct. 25, 1982, Ser. No. 436,294
Claims priority, application Japan, Dec. 28, 1979, 54-171068
Int. Cl.³ H01L *21/316*
U.S. Cl. 427—8 **8 Claims**



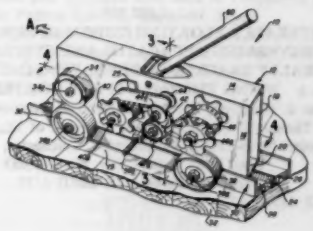
1. A method of chemical vapor deposition for growing phosphosilicate glass layers on a plurality of semiconductor wafers employing a sealed tube, inlets and an outlet arranged on said sealed tube for allowing reactive gases to flow in and out of said sealed tube, a manometer on said tube for monitoring the internal pressure of said sealed tube and a vacuum pump to cause said reactive gases to flow longitudinally through said sealed tube past the plurality of semiconductor wafers to allow said reactive gases to make chemical reaction with said plurality of semiconductor wafers aligned in a position selected from the vertical and inclined positions at a predetermined interval and in the transverse direction with respect to the longitudinal flow of said reactive gases through said sealed tube, the method comprising the step of regulating the longitudinal flow rate of said reactive gases through the sealed tube adjacent said semiconductor wafers, wherein the flow rate in terms of gas velocity of said reactive gases in the longitudinal direction through said sealed tube is 6 to 12 m/sec. at a position close to the first one of said plurality of semiconductor wafers and is regulated by employing said manometer which is arranged at said inlets of said sealed tube and which is calibrated by the longitudinal flow rate in terms of gas velocity of nonreactive gas through said sealed tube.

4,487,788

METHOD AND APPARATUS FOR TRANSFERRING THE PROFILE OF CONDITIONING MATERIAL ON A BOWLING LANE SURFACE

Carl E. Scheie, Libertyville, and Howard Knoebel, Champaign, both of Ill., assignors to Brunswick Corporation, Skokie, Ill.

Continuation of Ser. No. 333,060, Dec. 21, 1981, abandoned.
This application Jul. 12, 1983, Ser. No. 512,944
Int. Cl.³ B05D *3/12*; G01N *1/10*
U.S. Cl. 427—9 **14 Claims**



1. Apparatus for accurately transferring and recording, for subsequent analysis and evaluation, the thickness and distribution of liquid materials employed to condition a bowling lane, the apparatus comprising, in combination:

an elongated, absorbent strip, one side of said absorbent strip adapted to absorb liquid conditioning materials on a bowling lane surface; and

first means adapted to place the absorbent side of the absorbent strip in contact with the conditioned surface of a bowling lane; and

second means for guiding the first means along a predetermined path so that a sample strip can be prepared along a length of the bowling lane.

11. Apparatus for accurately transferring and permanently recording, for subsequent analysis and evaluation the thickness and distribution of liquid materials employed to condition a bowling lane, the apparatus comprising in combination:

an elongated absorbent strip, one side of said absorbent strip adapted to absorb conditioning materials on a bowling lane surface;

an absorbent strip dispensing roller about which the absorbent strip is wound;

an absorbent strip placement roller adapted to receive the absorbent strip from the absorbent strip dispensing roller and press the absorbent strip against the conditioned bowling lane surface;

an elongated backing strip adapted to be secured

means adapted to secure said backing strip to the absorbent side of the absorbent strip to form a sandwich upon re-

moval of the absorbent strip from the conditioned bowling lane surface; and strip-backing strip sandwich provides a permanent analyzable record of the thickness and distribution of conditioning materials applied to the surface of a bowling lane.

4,487,789

PROCESS FOR FORMING FILM OF HYDROLYZED ETHYLENE-VINYL ACETATE COPOLYMER

Teruo Iwanami, Ibaraki, and Kenji Hasegawa, Hirakata, both of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Feb. 9, 1984, Ser. No. 578,716
Claims priority, application Japan, Dec. 9, 1983, 58-233265; 58-233266; 58-233267; 58-233268
Int. Cl.³ B05D *3/02*
U.S. Cl. 427—407.1 **7 Claims**

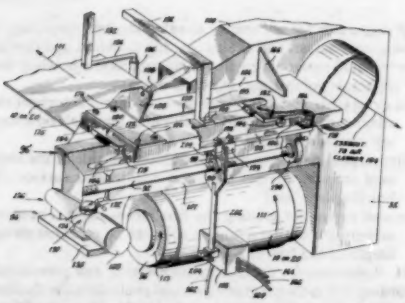
1. A process for forming a film of a hydrolysed ethylene-vinyl acetate copolymer which comprises applying a solution of the hydrolysed ethylene-vinyl acetate copolymer dissolved in a solvent to a substrate and drying the applied substrate, said copolymer having an ethylene content of 25 to 55% by mole and a degree of hydrolysis in the vinyl acetate component of at least 90% by mole, and said solvent consisting of (A) 10 to 60% by weight of water, (B) 5 to 70% by weight of at least one member selected from the group consisting of propyl alcohol, butyl alcohol and benzyl alcohol, and (C) 2 to 85% by weight of at least one member selected from the group consisting of formic acid, an alkyl formate, acetic acid, an alkyl acetate, dimethylsulfoxide and N-methylpyrrolidone.

4,487,790

LATERALLY FLOATING THERMAL SPRAY GUN TRAVERSING APPARATUS AND SYSTEM FOR LATERALLY TRACKING A REVOLVING CASTING BELT BEING THERMAL SPRAY COATED

Norman J. Bergeron, Burlington; Dean A. Boozan, Waterville, and Thomas E. Brennan, South Hero, all of Vt., assignors to Hazelett Strip-Casting Corporation, Colchester, Vt.

Filed Nov. 7, 1983, Ser. No. 549,653
Int. Cl.³ B05B *3/18*; B05D *1/10*
U.S. Cl. 427—422 **17 Claims**



12. In the applying of a thermal spray coating upon an endless flexible casting belt by a thermal spray gun which is traversed laterally across the face of the belt as the belt is being revolved around a plurality of rolls in a coating machine for impinging the thermally sprayed material on the belt in a generally helical pattern starting near one edge of the belt and progressing toward the other edge of the belt for coating the belt, the method comprising:

continually sensing the lateral location of an edge of the revolving belt, and

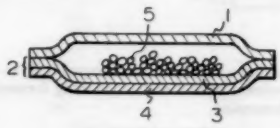
continually varying the lateral position of the traversing thermal spray gun with reference to the lateral location of an edge of the revolving belt during the thermal spray application for causing the successive paths of impingement of the thermally sprayed material on the belt surface to be uniformly spaced and blended with respect to each other regardless of any lateral wobbling of the revolving belt for achieving a uniform coating on the belt in spite of lateral wobbling of the revolving belt.

4,487,791

OXYGEN ABSORBENT PACKAGING

Toshio Komatsu, and Yukio Kondoh, both of Tokyo, Japan, assignors to Mitsubishi Gas Chemical Co., Inc., Tokyo, Japan

Filed May 11, 1982, Ser. No. 377,127
Claims priority, application Japan, May 12, 1981, 56-71170
Int. Cl.³ B32B *3/10*
U.S. Cl. 428—35 **2 Claims**



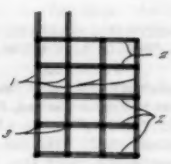
1. An oxygen absorbent package comprising an outer layer of plastic film, a single intermediate layer of plastic film laminated to said outer layer, a porous plastic outer layer and an oxygen absorbent disposed between said intermediate layer and said porous outer layer, said intermediate layer having a lower softening point than said outer layers and being in contact with and heat sealed to said outer layers around their peripheral edges.

4,487,792

PREFORMS FOR REINFORCEMENT OF BATTERY GRIDS

Hans S. Hartmann, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 21, 1982, Ser. No. 390,538
Int. Cl.³ B32B *5/12*
U.S. Cl. 428—105 **6 Claims**



1. A network sheet preform for reinforcing a lead or lead alloy battery grid comprising an array of spaced bundles of inorganic filaments superimposed upon and directionally displaced from another array of spaced bundles of inorganic filaments, said arrays being bonded to each other at filament bundle crossover points through lead bonds.

4,487,793

VINYL COVERED SOUND ABSORBING STRUCTURE

Charles Haines, Jr., and Raymond C. Kent, both of Lancaster, Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Continuation-in-part of Ser. No. 453,742, Dec. 27, 1982, abandoned. This application Oct. 28, 1983, Ser. No. 546,325
Int. Cl.³ B32B *3/24*; E04B *1/84*
U.S. Cl. 428—136 **1 Claim**

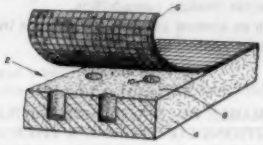
1. A sound absorbing structure comprising in combination:

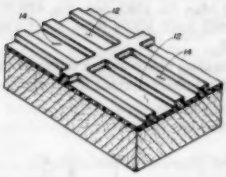
(a) a fiber composition rigid baseboard having a plurality of large perforations in one face thereof;

(b) a layer of fabric having an irregular outer surface contour

forming the structure facing, adhered to and covering the perforated face of said baseboard; and

(c) a fused resinous film covering said outer fabric layer and said film having an irregular surface contour, said resinous film and said fabric layer having multiple small sound emitting aperture means extending therethrough on the facing of the structure, a substantial number of said small irregular pierced aperture means being located in vertical





alignment with each of the perforations in the base board, the remainder of said small aperture means being in non-alignment with the perforations in the base board, said aperture means being of such small size and appearing as narrow line cracks or narrow slits so that, being located in the irregular contoured surface of the film and fabric layers, the aperture means are substantially invisible at normal viewing distances while still providing improved sound absorption capabilities.

4,487,794

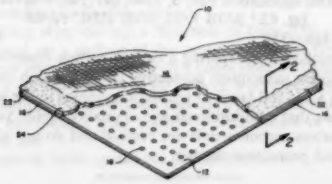
METHODS AND MEANS FOR MAINTAINING ELECTRICAL ISOLATION OF DISSIMILAR METALS WHEN CUTTING OR DRILLING IS REQUIRED

William D. Brown, Riverside County, and Ross E. Veta, San Diego County, both of Calif., assignors to Rohr Industries, Inc., Chula Vista, Calif.

Division of Ser. No. 525,469, Aug. 22, 1983,. This application Apr. 5, 1984, Ser. No. 597,026

Int. Cl.[3] **E04B** *1/82;* **B32B** *3/26, 27/04*

U.S. Cl. 428—137 **5 Claims**



1. Material for use within an aircraft jet engine inlet and nacelle structure wherein said material is exposed to the sound of jet engines and other noise producing mechanisms in acoustical attenuation applications, said material having a predetermined flow through resistance and adapted to be cut or drilled in defined selected portions and comprising:

(a) a perforated facing sheet;

(b) a thin sheet of porous material;

(c) a bonding medium bonding said porous material to a face of said perforated sheet selected from the class of adhesive systems whose melt viscosity, during the curing process, is sufficiently high so that the adhesive will not flow into the pores of the porous material by capillary attraction so as to maintain the full porosity of the porous material over the perforations of the perforated sheet, thereby isolating said porous material from the adjacent surface of the perforated sheet, the pores of the porous material providing communication between the outer surface of the porous material and the inner face of the perforated sheet; and

(d) a coating of a non electrically conductive liquid epoxy resin material applied to the combined layers of facing sheet, sheet of porous material, and bonding medium in the defined selected locations where cutting or drilling of the combined layers is required, said coating permeating the layers of porous material and bonding material to encapsulate such layers and to coat the walls of the perforations in the perforated facing sheet.

4,487,795

METHOD OF FORMING PATTERNED CONDUCTOR LINES

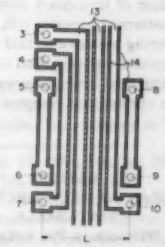
Hiroshi Yasuda, and Yasutaka Ban, both of Yokohama, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 31, 1982, Ser. No. 363,857

Claims priority, application Japan, Mar. 31, 1981, 56-46371

Int. Cl.[3] **B32B** *3/24;* **G03C** *5/00*

U.S. Cl. 428—138 **4 Claims**



1. An electronic device comprising:

(a) a substrate;

(b) an insulating layer formed on the substrate and having through holes formed therein;

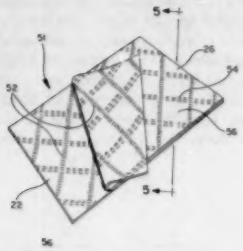
(c) a conductive layer formed on the insulating layer, said conductive layer comprising patterned conductor lines and remaining conductor portions, said patterned conductor lines and remaining conductor portions defined by forming a positive electron-sensitive resist layer on said conductive layer, selectively exposing the positive electron-sensitive resist layer to an electron beam to define linear latent images corresponding to contours of said patterned conductor lines, and removing the exposed area of the resist layer, wherein, the patterned conductor lines are electrically connected with other conductor lines or predetermined portions of the substrate through the through holes formed in the insulating layer and the remaining conductor portions are electrically isolated so that current does not flow in the remaining conductor portions.

4,487,796

LAMINATED, CREPED TISSUE AND METHOD OF MANUFACTURE

William D. Lloyd, Neenah, and Richard W. Evers, Appleton, both of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Jul. 2, 1981, Ser. No. 279,806
Int. Cl.³ B32B *29/00, 3/28*
U.S. Cl. 428—154 **11 Claims**



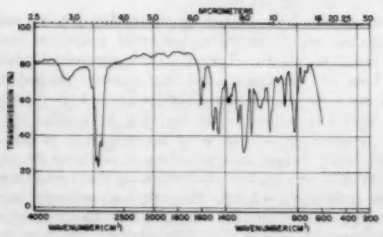
1. A method of forming a laminated multi-ply absorbent web comprising:
(a) applying a laminating adhesive to an inner surface of a first ply as said first ply is directed around a patterned pressure roll;
(b) bringing an inner surface of a second ply into contact with the inner surface of the first ply as said first and second plies are directed between said patterned pressure roll and a creping cylinder;
(c) applying pressure to said first and second plies in a nip formed between said patterned pressure roll and said creping cylinder such that said first and second plies are laminated to one another so as to form a composite web having a pattern of lamination corresponding to the pattern of said patterned pressure roll;
(d) applying creping adhesive to said creping cylinder such that said composite web is affixed to said creping cylinder in the pattern of said lamination, and
(e) differentially creping said composite web from said creping cylinder.

4,487,797

GLASS FIBERS TO REINFORCE POLYMERIC MATERIALS

James C. Watson, Wilkinsburg, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 1, 1983, Ser. No. 557,032
Int. Cl.³ B32B *7/00*
U.S. Cl. 428—268 **20 Claims**



1. One or more glass fibers having at least a portion of their surfaces covered with an aqueous chemical treating composition, comprising:
a. a water dispersible, emulsifiable or soluble epoxy novalac film forming polymer,
b. glass fiber coupling agent,
c. water soluble, dispersible or emulsifiable poly(oxyalkylene-oxyethylene)polyol copolymer having ethylene oxide present in an amount in the range of about 10 to about 40 weight percent of the copolymer, wherein the copolymer is present in an effective lubricating amount in the aqueous treating composition,
d. water in an amount to allow the aqueous treating composition to be applied to the fibers.

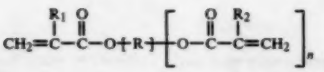
4,487,798

CURABLE POLY(ACRYLATE) MOLDING COMPOSITIONS CONTAINING A THERMOPLASTIC POLYMER LOW PROFILE ADDITIVE

Linda A. Domeier, Somerville, N.J., assignor to Union Carbide Corporation, Danbury, Conn.

Filed May 26, 1983, Ser. No. 498,502
Int. Cl.³ B29D *3/02*; B32B *9/04, 9/00*; C08K *3/04*
U.S. Cl. 428—288 **24 Claims**

1. A curable molding composition comprising a mixture of:
(a) a poly(acrylate) characterized by the following empirical formula:



wherein R is the hydroxy-free residue of an organic polyhydric alcohol which contained alcoholic hydroxyl groups bonded to different carbon atoms, R_1 and R_2 are independently hydrogen or methyl, and n is 1 to 3;
(b) an ethylenically unsaturated monomer which is soluble in and copolymerizable with (a);
(c) unsubstituted or substituted meta- and/or para-divinylbenzene; and
(d) a thermoplastic polymer low profile additive which is soluble in the mixture of (a), (b) and (c).

4,487,799

PYROLYTIC GRAPHITE PRETREATMENT FOR CARBON-CARBON COMPOSITES

Francis S. Galasso, Manchester, and Richard D. Veltri, East Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 391,614, Jun. 24, 1982, abandoned. This application Feb. 3, 1984, Ser. No. 576,774
Int. Cl.³ B32B *7/02, 9/00*; C23C *11/08*
U.S. Cl. 428—334 **4 Claims**

1. A method for preparing a carbon-carbon composite article to receive subsequent protective coating which comprises applying a 1–5 mil layer of pyrolytic graphite to the substrate surface, so that compositional and crystallographic variations in the carbon-carbon article are masked and do not affect the subsequent protective coating.

4,487,800

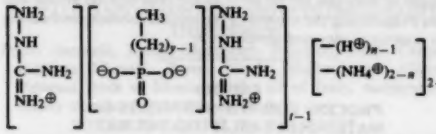
PROCESS FOR FIREPROOFING ORGANIC FIBRE MATERIAL USING PHOSPHONIC ACID SALTS

Hermann Nachbur, Reinach, and Christian Guth, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 342,880, Jan. 26, 1982, Pat. No. 4,452,849. This application Aug. 29, 1983, Ser. No. 527,545
Claims priority, application Switzerland, Feb. 3, 1981, 700/81
Int. Cl.³ B32B *7/00*; B05D *3/02*
U.S. Cl. 428—265 **6 Claims**

1. A process for fireproofing organic fibers, comprising the

step of applying to the fibers an aqueous solution of a phosphonic acid salt of the formula



in which n, t and y are each 1 or 2.

6. A textile bearing thereon a fire retardant finish conferred by the process of claim 1.

4,487,801

FRAGRANCE-RELEASING PULL-APART SHEET

Everett M. Turnbull, Hastings, Minn., and Jack W. Charbonneau, Sommerset, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 11, 1983, Ser. No. 540,501
Int. Cl.³ B32B 5/16, 29/04
U.S. Cl. 428—313.5 20 Claims

1. A device for exposing a liquid to the atmosphere so as to enable said liquid to react, or at least partially evaporate, said device comprising

(1) at least two sheets bound by a single layer of a non-pressure sensitive adhesive composition layer,

(2) said adhesive composition layer containing microcapsules with said liquid within the shell of the microcapsules, and

(3) said microcapsules having an average diameter between 8 and 30 micrometers, the cohesive strength of the adhesive composition layer being less than the strength of the bond between said adhesive composition and said sheets, and the tensile rupture strength of said microcapsules being less than the cohesive strength of the adhesive composition.

4,487,802

MAGNETIC RECORDING MEDIUM

Takahito Miyoshi; Toshimitu Okutu; Masaaki Fujiyama, all of Kanagawa; Sumitaka Tatsuta, Shizuoka, and Nobuo Tsuji, Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 19, 1983, Ser. No. 459,089
Claims priority, application Japan, Jan. 19, 1982, 57-6427
Int. Cl.³ G11B 5/62, 5/68
U.S. Cl. 428—336 5 Claims

1. A magnetic recording medium comprising:

a non-magnetic flexible support;

a subbing layer having a thickness of from 0.01 to 1.0 μm coated on a surface of the support, wherein the subbing layer consists essentially of a copolymer of 10 to 60 wt% of a diolefin and 90 to 40 wt% of a styrene based on the weight of the copolymer and has a gel fraction of 60 wt% or more and a glass transition temperature of 90° C. or less; and

a magnetic layer coated on the subbing layer.

4,487,803

BORIC ACID HAVING IMPROVED HANDLING PROPERTIES

George W. Campbell, Hesperia, and Jerome T. Muench, Lancaster, both of Calif., assignors to United States Borax & Chemical Corporation, Los Angeles, Calif.

Division of Ser. No. 345,267, Feb. 2, 1982, Pat. No. 4,419,387. This application Jul. 25, 1983, Ser. No. 516,835
Int. Cl.³ B32B 5/16; B05D 7/00
U.S. Cl. 428—403 5 Claims

1. Particulate boric acid predominately smaller than about 75 microns having an effective amount of ammonia chemically bonded to the surface thereof, thereby reducing the lubricity of the particles.

4,487,804

COATING TO PREVENT THE OXIDATION OF ELECTRODES DURING ELECTRIC FURNACE STEEL MAKING

Frederick V. Reven, Homewood, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Aug. 2, 1982, Ser. No. 404,099
Int. Cl.³ H01J 1/14; B32B 17/06
U.S. Cl. 428—408 10 Claims

1. An electrically conductive consumable carbon and/or graphite electrode having an impermeable coating of less than 1" thickness of a non-electrically conducting crystallized devitrifyable silica-phosphate glass containing titanium dioxide.

8. A method of protecting carbon and graphite electrodes used in the production of ferrous metals in electrical arc furnaces from oxidation during use which comprises coating said electrodes prior to their use with a composition comprising in percentages by weight:

10–70% water;

0.5–15% finely divided silicon dioxide having a particle size less than 200 mesh;

1–25% phosphoric acid;

2–50% titanium dioxide having a particle size of less than 375 mesh;

2–50% silicon carbide;

0.05–7.5% sodium hexameta phosphate;

0.1–5.0% organic thickener;

whereby the composition forms a crystallized devitrifyable silica-phosphate glass protecting the electrode from oxidation during use.

4,487,805

DECORATIVE EPOXY RESIN AGGREGATE BINDER FORMULATION

Kathy B. Sellstrom, Austin, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Mar. 15, 1984, Ser. No. 589,813
Int. Cl.³ C08K 5/34
U.S. Cl. 428—413 11 Claims

1. An epoxy resin composition comprising

(a) a vicinal polyepoxide having an average of at least 1.8 reactive 1,2-epoxy groups per molecule; and

(b) a stoichiometric amount of a curing agent comprising:

(i) 20 to 30 parts by weight of a first diamine of the general formula:

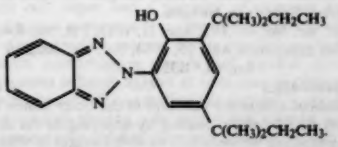
$$H_2NCH(CH_3)CH_2[OCH_2CH(CH_3)]_xNH_2$$

wherein x averages from 1 to 6;

(ii) 20 to 30 parts by weight of nonylphenol; and

(iii) 1 to 8 parts by weight of N-aminoethylpiperazine, and

(iv) 0.8 to 5 parts by weight of a substituted benzotriazole UV absorber of the formula:



4,487,806

DECORATIVE EPOXY RESIN AGGREGATE BINDER FORMULATION

Kathy B. Seilstrom, and Harold G. Waddill, both of Austin, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Mar. 15, 1984, Ser. No. 589,814

Int. Cl.³ C08L *63/00*

U.S. Cl. 428—413 **11 Claims**

1. An epoxy resin composition comprising

(a) a vicinal polyepoxide having an average of at least 1.8 reactive 1,2-epoxy groups per molecule; and

(b) a stoichiometric amount of a curing agent comprising:

(i) 20 to 30 parts by weight of a first diamine of the general formula:

$$H_2NCH(CH_3)CH_2[OCH_2CH(CH_3)]_xNH_2$$

wherein x averages from 1 to 6;

(ii) 12 to 50 parts by weight of nonylphenol; and

(iii) 2 to 8 parts by weight of m-xylylenediamine.

4,487,807

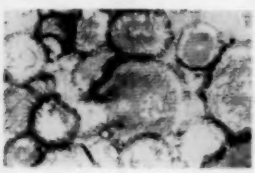
MIXED ACID STAIN INHIBITOR

Paul F. Duffer, Creighton; Joseph D. Kelly, Cheswick, and Helmut Franz, Pittsburgh, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sep. 29, 1982, Ser. No. 427,380

Int. Cl.³ B32B *27/00*

U.S. Cl. 428—422 **10 Claims**



1. A method for protecting a glass surface which comprises the steps of:

a. contacting the glass surface with a solution of a mixture of stain-inhibiting organic carboxylic acids, at least one of which is a hydroxy acid, which mixture crystallizes upon evaporation of the solvent;

b. evaporating the solvent to form a crystallized mixed acid deposit on the glass surface; and

c. applying to the acid treated glass surface an interleaving material prior to contacting the glass surface in facing relationship with another glass surface.

10. An article of manufacture comprising:

a. a plurality of glass sheets, the surfaces of which are separated by a crystallized deposit comprising a mixture of stain-inhibiting organic carboxylic acids comprising at least one hydroxy acid; and

b. an interleaving material interspersed between said glass sheets.

4,487,808

MEDICAL ARTICLE HAVING A HYDROPHILIC COATING

Hans R. Lambert, Askim, Sweden, assignor to Astra Meditec Aktiebolag, Sodertalje, Sweden

Division of Ser. No. 487,102, Apr. 21, 1983, Pat. No. 4,459,317. This application Apr. 25, 1984, Ser. No. 603,568

Int. Cl.³ B32B *27/40*

U.S. Cl. 428—423.1 **10 Claims**

1. A medical article for insertion in the body which is provided with a hydrophilic coating by applying to the article a solution containing between 0.05 to 40% (weight to volume) of a compound which comprises at least two unreacted isocyanate groups per molecule, evaporating the solvent, applying a second solution containing between 0.5 to 50 % (weight to volume) of polyethylene oxide having a mean molecular weight of between 10^4 to 10^{-7} to the thus treated article and then evaporating the solvent of the second solution, and curing the coating at elevated temperature.

4,487,809

PROCESS FOR THE SYNTHESIS OF A WATER-DILUTABLE, HEAT-CURABLE ORGANOPOLYSILOXANE, MODIFIED WITH ORGANIC POLYOLS

Götz Koerner, Essen; Manfred Priesch, Recklinghausen; Harald Rau, and Eckehard Schamberg, both of Essen, all of Fed. Rep. of Germany, assignors to Th. Goldschmidt AG, Essen, Fed. Rep. of Germany

Filed Apr. 7, 1983, Ser. No. 482,948

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1982, 3214985

Int. Cl.³ B32B *9/04*

U.S. Cl. 428—447 **15 Claims**

1. A process for the synthesis of a heat-curable vehicle for coatings which can be diluted with water after neutralization comprising reacting in the presence of a catalyst

(a) an alkoxysiloxane having the formula

$$R_a^2Si(OR^1)_bO_{\frac{4-(a+b)}{2}}$$

wherein

R^1 is a lower alkyl radical with up to 4 carbon atoms,

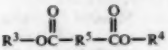
R^2 is an alkyl or phenyl groups, and

a=1.0 to 1.2,

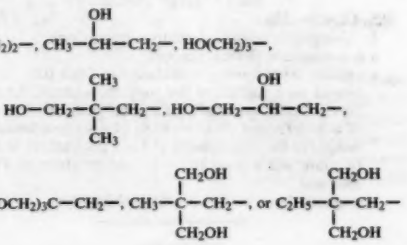
b=0.5 to 1.2,

with the proviso that at least 50 weight percent of the alkoxysiloxane is distillable at 1 to 15 mbar; with

(b) a polyol which is the reaction product of a monoanhydride of a polycarboxylic acid and a compound having the formula



in which R^3 and R^4 may be the same or different and represent the groups



and there are at least three hydroxyl groups in the compound and R^5 is an alkylene, cycloalkylene or phenylene group; wherein the reaction product contains at least two hydroxyl groups;

the alkoxysiloxane being reacted with the polyol to a degree of reaction of not more than 70% but to an extent that a clear solution is obtained.

7. A heat-curable binder produced by the process of claim **1**.

13. A coating comprising a coating agent and a binder therefore wherein the binder is the binder of claim **7**.

15. A substrate coated with the coating of claim **13**.

4,487,810

THERMOPLASTIC COMPOSITIONS BASED ON NON-POLAR ORGANIC POLYMERS AND ZEOLITES IN ACID FORM; WHICH HAVE STRONG ADHESION TO METALS, AND COMPOSITE OBJECTS OBTAINABLE THEREFROM

Paolo Ascarelli, Rome; Gianfranco Boccalon, Passo Corese; Giuliano Moretti, Rome; Nicola Nistico', and Alberto Pelacani, both of Monterotondo, all of Italy, assignors to Enoxy Chimica S.p.A., Sassari, Italy

Filed May 3, 1983, Ser. No. 491,037
Claims priority, application Italy, May 7, 1982, 21131 A/82
Int. Cl.³ C08K 3/34
U.S. Cl. 428—461 12 Claims

1. A thermoplastic composition which comprises organic polymers and at least one anhydrous crystalline zeolite in acid form, of which the exchangable ions are replaced totally or partially by H^+ ions said zeolite having a particle size less than 10 microns and an internal pore diameter of greater than 3 Angstroms.

4,487,811

ELECTRICAL CONDUCTOR

Charles W. Eichelberger, Schenectady, and Robert J. Wojnarowski, Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 220,342, Dec. 29, 1980, Pat. No. 4,404,237.
This application Jan. 28, 1983, Ser. No. 461,809
Int. Cl.³ B22F 7/04; H05K 3/12, 3/18
U.S. Cl. 428—546 27 Claims

1. An electrical conductor adhered to desired areas upon a surface of an underlying substrate, in which said conductor comprises: a cured polymer containing therein a finely divided first metallic composition having a particle size greater than about 3 microns and a second metal, the amount of the metals in said cured polymer being about 60%–80% by volume; and a contiguous layer of said second metal on said cured polymer, wherein said second metal is below the first metal in the activity series of the metals.

4,487,812

MAGNETIC AMORPHOUS ALLOY SHEET HAVING A FILM THEREON

Hironobu Kawasaki; Takashi Sato; Tomohiko Hayashi, and Tsutomu Ozawa, all of Kawasaki, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Jul. 15, 1983, Ser. No. 514,016
Claims priority, application Japan, Jul. 22, 1982, 57-126789
Int. Cl.³ C23C 3/02; C25D 5/12
U.S. Cl. 428—629 9 Claims

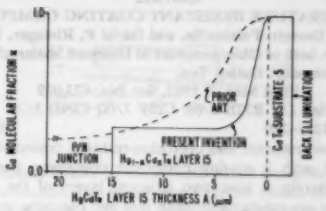
1. A magnetic amorphous alloy sheet having an improved insulating property and an improved corrosion resistance, wherein the improvement comprises a film having a maximum thickness of 1 μm disposed on and covering the surface of said magnetic amorphous alloy sheet wherein said film consists essentially of hydrated chromium oxide.

4,487,813

COMPOSITION CONTROL OF CSVPE HGCDTE

Robert E. Kay, Newport Beach, Calif., assignor to Ford Aerospace & Communications Corporation, Detroit, Mich.

Division of Ser. No. 447,082, Dec. 6, 1982, Pat. No. 4,447,470.
This application Sep. 26, 1983, Ser. No. 536,018
Int. Cl.³ H01L 9/00, 7/36
U.S. Cl. 428—620 2 Claims



1. A layer of HgCdTe epitaxially grown on a CdTe substrate using the closed-space vapor space epitaxy method, wherein the thickness of the grown HgCdTe layer is between 3 microns and 24 microns, and the mole fraction of cadmium in the HgCdTe which is situated greater than 20% of the HgCdTe layer thickness away from the CdTe substrate varies by no more than 10% as a function of distance from the substrate; wherein

said layer is formed by a process in which a HgTe source material and CdTe substrate are spaced apart from each other by a distance of between 0.1 mm and 10 mm; and

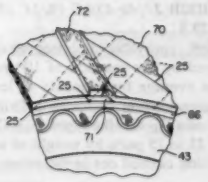
the source material and the substrate are then heated together at a constant processing temperature of between 520° C. and 625° C. for a fixed processing time of between ¼ hour and 4 hours.

4,487,814

POLYMERIC STRIP FOR A POWER TRANSMISSION BELT, BELT MADE USING SUCH STRIP

Gerald C. Hollaway, Jr., Springfield, Mo., assignor to Dayco Corporation, Dayton, Ohio

Division of Ser. No. 263,963, May 15, 1981, Pat. No. 4,434,019.
This application Dec. 1, 1983, Ser. No. 557,026
Int. Cl.³ B32B 3/00
U.S. Cl. 428—57 16 Claims



1. In a substantially rectangular strip of material having opposed ends, said strip of material being adapted for use in a power transmission belt construction, said strip comprising an uncured polymeric matrix material having opposed surfaces, each surface having a pair of opposed side edges and a pair of opposed end edges, and a plurality of elongate reinforcing fibers disposed substantially uniformly throughout said matrix material in a random manner and in parallel relation, the improvement comprising a plurality of parallel spaced apart bleeder yarns adhered against at least one of said surfaces so that each edge of said one surface has a plurality of said bleeder yarns extending thereto, said strip being adapted to be laminated against associated layer means comprising said belt construction on at least one common interface with said bleeder

yarns along said interface, said opposed ends being disposed in overlapping relation on a common interface therebetween with certain of said bleeder yarns along said interface of said ends, and said bleeder yarns being adapted to serve as fluid passages for any fluid present at said interfaces during curing of said strip and its associated layer means.

4,487,815

TEMPERATURE RESISTANT COATING COMPOSITE

Terry E. Dorsett, Painesville, and David P. Rininger, Fairport Harbor, both of Ohio, assignors to Diamond Shamrock Chemicals Company, Dallas, Tex.

Filed Mar. 7, 1983, Ser. No. 473,009

Int. Cl.³ B32B *9/06*; C23F *7/00*; C09D *5/10*

U.S. Cl. 428—219 **16 Claims**

1. A heat-resistant and corrosion-resistant coated substrate protected with a coating composite containing particulate metal, wherein at least two adjacent layers of the coating composite are substantially resin free and comprise an undercoating and a topcoating, with the undercoating containing said particulate metal, each coating being established from compositions curable to water resistant protective coatings, with the undercoating being applied as a substantially resin free composites containing, in liquid medium, a hexavalent-chromium-providing substance, boric acid component, and particulate zinc plus particulate aluminum, with the aluminum providing greater than 15, but less than 85 percent, by weight of combined particulate zinc and aluminum and with said undercoating being applied in an amount sufficient to provide, upon curing, above 10 but not substantially above about 5000 milligrams per square foot of coated substrate of particulate metal, and with said topcoating being applied as a substantially resin free as well as particulate metal free composition containing silica substance in liquid medium in an amount sufficient to provide above about 50 milligrams per square foot of coated substrate of silica substance in cured topcoating.

4,487,816

SPRAYABLE, MODIFIED POLYISOCYANURATE COMPOSITION AND ARTICLES THEREFROM

Stuart B. Smith, Conyers, Ga., assignor to Thermocell Development, Ltd., Knoxville, Tenn.

Continuation-in-part of Ser. No. 482,631, Apr. 6, 1983, Pat. No. 4,467,014, which is a continuation-in-part of Ser. No. 398,369, Jul. 14, 1982, Pat. No. 4,426,461. This application Jan. 4, 1984, Ser. No. 568,037

Int. Cl.³ B32B *27/40*; C08G *18/14*, *18/32*, *18/22*

U.S. Cl. 428—423.3 **27 Claims**

1. A modified, sprayable polyisocyanurate composition which is prepared by the reaction of 100 parts by weight of MDI, having an average functionality of less than about 2.4, with a polyol composition comprising from about 25 to 50 parts by weight of a C_1–C_3 alkoxypoly C_2–C_3 alkylene glycol, and from about 25 to 75 parts by weight of a methyl glucoside polyol, the reaction carried out in the presence of a trimerization catalyst.

19. A sprayable, modified polyisocyanurate composition, which composition is prepared by the reaction of an equal-volume amount of an A-side and a B-side mixture, the A-side mixture comprising about 100 parts by weight of an MDI, having an average functionality of less than about 2.4, and the B-side mixture comprising a polyol composition comprising from about 25 to 50 parts by weight of a methoxy polyethoxy glycol, and from about 25 to 75 parts by weight of a methyl glucoside polyol having a hydroxyl number of less than about 400, a potassium salt trimerization catalyst, a zinc salt to control the cream time and a tetravalent tin catalyst and a polyamine catalyst, to promote cross-linking.

25. A substrate which comprises a rigid-foam material and which includes a coating thereon of the modified polyisocyanurate composition of claim 19.

4,487,817

ELECTROCHEMICAL CELL COMPRISING STABLE HYDRIDE-FORMING MATERIAL

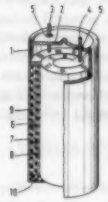
Johannes J. G. S. A. Willems; Johann R. G. C. M. van Beek, and Kurt H. J. Buschow, all of Groenewoudseweg 1, Eindhoven, Netherlands

Filed Mar. 9, 1984, Ser. No. 587,795

Claims priority, application Netherlands, Oct. 21, 1983, 8303630

Int. Cl.³ H01M *4/00*

U.S. Cl. 429—27 **6 Claims**



1. An electrochemical cell comprising a positive electrode, an aqueous alkaline electrolyte, and comprising a negative electrode the electrochemically active material of which consists of an intermetallic compound forming a hydride with hydrogen, characterized in that the electrochemically active material of the negative electrode consists of an intermetallic compound having the $CaCu_5$ structure of the type of the formula AB_mC_n, where m+n is between 4.8 and 5.4, in which n is between 0.05 and 0.6, in which A consists of Mischmetall or of at least one element selected from the group consisting of Y, Ti, Hf, Zr, Ca, Th, La and the remaining rare earth metals, in which the total atomic quantities of the elements Y, Ti, Hf and Zr may not be more than 40% of A, in which B consists of two or more elements selected from the group formed by Ni, Co, Cu, Fe and Mn, the maximum atomic quantity per gram atom of A being for Ni: 3.5, for Co: 3.5, for Cu:3.5, for Fe:2.0 and for Mn:1.0, and in which C consists of at least one element selected from the group formed by Al, Cr and Si in the following indicated atomic quantities:

Al0.05–0.6,
Cr0.05–0.5 and
Si0.05–0.5.

4,487,818

FUEL CELL ANODE BASED ON A DISORDERED CATALYTIC MATERIAL

Stanford R. Ovshinsky, Bloomfield Hills; Krishna Sapru, Troy, and Arie Reger, Birmingham, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Filed Jul. 19, 1982, Ser. No. 399,876

Int. Cl.³ H01M *4/86*

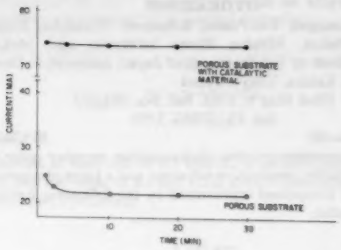
U.S. Cl. 429—44 **37 Claims**

1. A fuel cell comprising:

at least one anode means for efficient hydrogen oxidation, said anode means being formed from a compositionally disordered non-equilibrium multicomponent catalytic material, said anode means including a host matrix having at least one transition element and incorporating at least one modifier element;

a casing having said anode means positioned therein;

at least one cathode capable of oxygen reduction positioned within said casing and spaced from said anode means; and



an electrolyte in contact with both said cathode and said anode means.

4,487,819

FLAT BATTERY

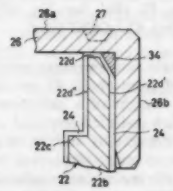
Ryoji Koga, Kawaguchiko, Japan, assignor to Kawaguchiko Seimitsu Company Limited, Yamanashi, Japan

Filed Dec. 22, 1982, Ser. No. 452,391

Claims priority, application Japan, Dec. 26, 1981, 56-213908; Feb. 4, 1982, 57-16875; Feb. 19, 1982, 57-26547; Feb. 27, 1982, 57-31050

Int. Cl.³ H01M *2/12, 2/08*

U.S. Cl. 429—82 **26 Claims**



1. A flat battery comprising:

a cathode can including a bottom portion, cylindrical upstanding portion extending upward from the outer circumference of said bottom portion and a step portion provided at an inner part of said upstanding portion;

an insulative film continuously coating surfaces of from said step portion to an outer surface of said upstanding portion;

a cathode active substance electrically contacted to said cathode can;

an anode can including an upper portion and a cylindrical portion extending downward from the outer circumference of said upper portion;

an anode active substance electrically contacted to said anode can; and

a separator having an outer circumferential portion set on said step portion and isolating said cathode active substance and anode active substance to prevent an electrical short-circuit;

wherein said cylindrical portion of said anode can is shrinkage-fitted onto said cylindrical upstanding portion of said cathode can through the intermediary of said insulative film.

4,487,820

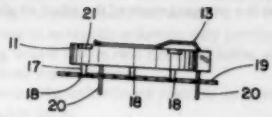
BATTERY HOLDER FOR COIN CELLS

Charles Engelstein, South Orange, N.J.; David L. Kassel, New York, and Harry Goodman, Rockville Centre, both of N.Y., assignors to Memory Protection Devices, Inc., Farmingdale, N.Y.

Filed Jul. 25, 1983, Ser. No. 516,884

Int. Cl.³ H01M *2/10*

U.S. Cl. 429—100 **5 Claims**



1. A battery holder for a coin cell, which comprises a casing having a bottom and a peripheral barrier means disposed to receive a coin cell against the bottom and laterally constrained by the peripheral barrier means; a first electrically conductive contact extending along said bottom of the casing to engage one pole of the coin cell, and a second electrically conductive contact extending above the bottom of the casing to engage the other pole of the coin cell, and comprises at least one projecting member on the bottom of said casing disposed for insertion into a matching hole of a support means to secure the battery holder thereupon.

4,487,821

BATTERY CELL FOR A PRIMARY BATTERY

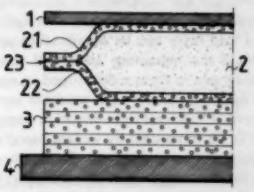
Allan Häkkinen, Vantaa, Finland, assignor to Innovex Oy, Helsinki, Finland

Filed Jun. 24, 1981, Ser. No. 276,887

Claims priority, application Finland, Jul. 1, 1980, 802104

Int. Cl.³ H01M *6/34*

U.S. Cl. 429—119 **12 Claims**



1. A battery cell for a primary battery, particularly a flat cell battery to be activated when submerged into water, comprising:

a positive current collector;

a negative electrode;

a separator layer which, being in contact with the negative electrode, is disposed between said negative electrode and the positive current collector;

a depolarizing layer containing a depolarizing agent and being disposed between the positive current collector and the separator layer; and

an intermediate layer of a porous, electrically insulating, and water-absorbing material and limited by the positive current collector and arranged in contact with the depolarizing agent; said intermediate layer being a part of a pad structure disposed between the positive current collector and the separator layer inside of which the depolarizing agent is placed, the pad structure being heat sealed or sealed by folding.

4,487,822

GALVANIC CELL WITH TIN FLUOBORATE ELECTROLYTE

Samuel Ruben, 52 Seacord Rd., New Rochelle, N.Y. 10803

Filed Jun. 21, 1982, Ser. No. 390,387

Int. Cl.³ H01M 6/04

U.S. Cl. 429—199 **4 Claims**

1. A primary cell having an electrolyte of tin fluoborate, a cathodic reactant and an anode, characterized in that the cathodic reactant is a permanganate of the alkali or alkaline earth metals.

4,487,823

LIGHT-SENSITIVE COPYING MATERIAL AND PROCESS FOR THE MANUFACTURE THEREOF UTILIZING NON-IONIC FLUORINATED ESTER SURFACTANT

Peter Lehmann, Kelkheim; Dieter Mohr, and Kurt Reiss, both of Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Framkfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 272,959, Jun. 12, 1981, abandoned. This application Oct. 29, 1982, Ser. No. 437,553

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1980, 3022362

Int. Cl.³ G03C 1/495, 1/68, 1/60; G03G 5/04

U.S. Cl. 430—56 **13 Claims**

1. A light-sensitive copying material, comprising:

a support sheet; and

a light-sensitive layer which undergoes a change in solubility in a developer upon exposure to actinic light so that when said layer is selectively exposed to a light image, selected areas of said layer can be dissolved in an aqueous developer while the remaining areas will resist dissolution in said developer to form a developed image corresponding to said light image, said light-sensitive layer comprising in admixture at least one light-sensitive component and from about 0.01 to 10 percent by weight based on the weight of the light-sensitive layer of a surfactant having a molecular weight in the range from about 300 to 3,500 and comprised of a non-ionic ester obtained by reacting a perfluorinated alkane carboxylic acid with a polyalkylene glycol or an ether obtained by reacting a highly fluorinated or a perfluorinated alkanol with a polyalkylene glycol.

10. A light-sensitive copying material produced by:

coating a support sheet with a solution comprising at least one light-sensitive component selected from the group consisting of diazo compounds, mixtures of an acid cleavable compound and a photolytic acid donor, mixtures of an ethylenically unsaturated compound and a photoinitiator, and photoconductive materials and from about 0.005 to 1 percent of a non-ionic fluorinated surfactant dissolved in a single organic solvent, to form a thin layer of the solution on the support, said surfactant having a molecular weight in the range from about 300 to 3,500 and comprising a non-ionic ester obtained by reacting a perfluorinated alkane carboxylic acid with a polyalkylene glycol or an ether obtained by reacting a highly fluorinated or a perfluorinated alkanol with a polyalkylene glycol; and

drying the thin layer to remove the solvent therefrom to produce a light-sensitive layer on the support sheet.

4,487,824

ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MEMBER CONTAINING A HALOGEN SUBSTITUTED HYDRAZONE

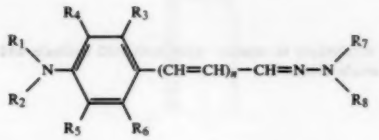
Kazuharu Katagiri, Yokohama; Katsunori Watanabe, Toride; Kiyoshi Sakai, Mitaka; Shozo Ishikawa, and Makoto Kitahara, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 9, 1983, Ser. No. 492,632

Int. Cl.³ G03G 5/06

U.S. Cl. 430—58 **25 Claims**

1. An electrophotographic photosensitive member comprising an electrically conductive substrate and a layer comprising a hydrazone compound represented by the following formula (1) and a binder:



wherein; R_1 and R_2 each represent alkyl, aralkyl, or aryl, substituted or unsubstituted, or R_1 and R_2 together with the nitrogen atom to which they are attached form a 5- or 6-membered ring; R_3 represents halogen or fluoroalkyl; R_4 and R_6 each represent hydrogen or halogen; R_5 represents hydrogen, alkyl, alkoxy, or halogen; each of R_7 and R_8 represents alkyl, aralkyl, or aryl, substituted or unsubstituted; and n represents an integer of 0 or 1.

4,487,825

CONDUCTIVE SINGLE COMPONENT ELECTROPHOTOGRAPHIC MAGNETIC TONER

Robert J. Gruber, Pittsford, and John F. Knapp, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 22, 1981, Ser. No. 227,003

Int. Cl.³ G03G 9/14

U.S. Cl. 430—106.6 **3 Claims**

1. A conductive single component magnetic dry toner composition comprised of from about 40 percent by weight to about 60 percent by weight of a polystyrene allyl alcohol copolymer resin, which resin is comprised of from about 50 percent to about 90 percent by weight of polystyrene, and from about 10 percent to about 50 percent by weight of allyl alcohol, and wherein the molecular weight of the polystyrene ranges from about 3,000 to about 100,000; and from about 60 percent by weight to about 40 percent by weight of a magnetic material, said toner composition further containing from about 0.5 percent to about 4 percent of a conductive carbon black which is adhered to or embedded in the surface of the polystyrene allyl alcohol copolymer resin magnetic mixture by heat spheroidization, thereby resulting in a toner composition having a conductivity of from 10^{-4} to 10^{-10} $(ohms/cm)^{-1}$, and a fusing temperature of from about 95° C. to about 130° C.

4,487,826

DIAZOTYPE HEAT DEVELOPMENT RECORDING MEDIUM WITH HYDROPHOBIC SALT OF ALKYL SUBSTITUTED GUANIDINE

Niro Watanabe; Shiro Nemoto; Hiroyuki Yasujima, all of Tokyo, and Kaneki Yoshida, Niiza, all of Japan, assignors to Toppan Printing Co., Ltd., Tokyo, Japan

Filed Jan. 17, 1983, Ser. No. 458,717

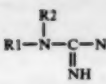
Claims priority, application Japan, Jan. 27, 1982, 57-11243

Int. Cl.³ G03C 1/60

U.S. Cl. 430—176 **12 Claims**

1. A diazotype heat development recording medium, comprising a support and a recording layer which is formed on said support and which comprises a diazonium compound, a cou-

pler, an acid stabilizer, a thermal developer, and a polymeric binder, wherein the thermal developer is a hydrophobic salt of an organic or inorganic acid having a primary dissociation constant of 2×10^{-1} to 1×10^{-4} with an alkyl substituted guanidine represented by a general formula:



(wherein at least one of R1 and R2 is an alkyl group of C_8 to C_{24}, and the other of R1 and R2 is a hydrogen atom or an alkyl group of C_1 or more).

4,487,827

PROCESS FOR THE BURNING-IN OF LIGHT-SENSITIVE LAYERS DURING THE PREPARATION OF PRINTING FORMS

Günter Berghaeuser, Wiesbaden, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 15, 1982, Ser. No. 358,385

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1981, 3110632

Int. Cl.³ G03F *7/08*

U.S. Cl. 430—302 **5 Claims**

1. In a process for the preparation of an offset printing form, comprising exposing and developing a single, positive-working light-sensitive layer provided on a support, said layer containing a diazo compound as a light-sensitive ingredient of the light-sensitive layer to be processed,

the improvement consisting essentially of burning-in said layer to be processed by heating the printing form to at least 180° C. by exposure to electromagnetic radiation which contains an infrared fraction of 50 to 87 percent, a fraction in the visible region of 10 to 30 percent, and an ultraviolet fraction of 3 to 30 percent, for a period of time between about 15 to 90 seconds which will not adversely affect the mechanical properties of said support to a significant extent, wherein the printing form is irradiated by said electromagnetic radiation from the side of said exposed and developed layer.

4,487,828

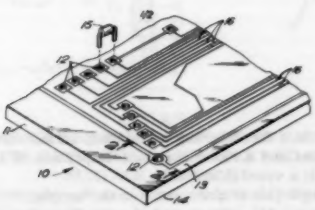
METHOD OF MANUFACTURING PRINTED CIRCUIT BOARDS

Raymond C. Hladovcak, Seneca, and Walter W. Keating, Oswego, both of Ill., assignors to AT&T Technologies, Inc., New York, N.Y.

Filed Jun. 3, 1983, Ser. No. 500,681

Int. Cl.³ B05D *3/06*

U.S. Cl. 430—313 **2 Claims**



1. The method of manufacturing a printed circuit board comprising the steps of:

(a) processing an insulative substrate (1) to form on a surface of such substrate on one side thereof a plurality of fine line conductor paths, and terminals pads therefor, in such manner that said paths are separated by narrow interpath areas of such surface, and that both said paths and said pads comprise inner and outer layers of copoper and solder, respectively, and (2) to further form in said substrate a plurality of through holes in centered relation with said pads and having on the sides of their interiors said inner and outer layers of copper and solder,

(b) coating said substrate on said side thereof with photopolymer resist so as to cover by such resist all of said pluralities of paths, pads and holes,

(c) exposing to energetic radiation only portions of the resist coating which are on said pads and holes, so as to harden only those resist portions,

(d) removing the unhardened resist so as to leave bare said conductor paths,

(e) applying a liquid solder stripping medium to said substrate so as to strip from said circuit paths the solder layer thereof without removal of the copper layer thereof, and

(f) after termination of said stripping step, removing said hardened resist portions so as to leave bare the solder layer areas of said pads and holes which were previously covered by said hardened portions.

4,487,829

PRODUCTION AND USE OF MONOCLONAL ANTIBODIES AGAINST ADENOVIRUSES

Phillip A. Sharp, Newton; Constance L. Cepko, Allston, and Paul Changelian, Brookline, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Mar. 23, 1982, Ser. No. 361,017

Int. Cl.³ G01N *33/54*; C12P *21/00*; C12N *5/00*; A61K *39/42*

U.S. Cl. 435—7 **15 Claims**

1. A monoclonal antibody demonstrating specific reactivity to an antigenic determinant possessed by a plurality of types of adenoviruses, the antibody characterized further by its reactivity with hexon trimers derived from adenoviruses and its lack of reactivity in immunoprecipitation reactions with intact adenovirus virions, denatured hexon polypeptides and monomeric hexon polypeptides.

4,487,830

ENZYME/IMMUNOFLUORESCENT ASSAY FOR AUTOANTIBODIES

Stephen R. Coates, Leucadia, and Walter L. Binder, San Diego, both of Calif., assignors to American Hoechst Corporation, Somerville, N.J.

Filed May 14, 1982, Ser. No. 378,290

Int. Cl.³ G01N *33/54*; C12Q *1/28*

U.S. Cl. 435—7 **9 Claims**

1. A method for the determination of autoantibody in a test sample, comprising:

providing a substrate for said autoantibody;

contacting said substrate with test sample;

treating said contacted substrate with labeled antihuman antibody, said labeled antihuman antibody selected from the group consisting of:

(1) a mixture comprising enzyme labeled antihuman antibody and fluorescent labeled antihuman antibody; and

(2) antihuman antibody labeled with an enzyme and a fluorescent label;

determining the enzyme activity of the treated substrate; and determining the immunofluorescent pattern in substrates exhibiting enzyme activity.

4,487,831

PROCESS FOR THE CONVERSION OF CELLULOSE TO GLUCOSE

Donal F. Day, and Wesley E. Workman, both of Baton Rouge, La., assignors to Research Corporation, New York, N.Y.

Filed May 19, 1982, Ser. No. 380,025
Int. Cl.³ C12P 19/14; C12N 9/42; C12R 1/66, 1/885
U.S. Cl. 435—99 19 Claims

16. A purified enzyme comprising cellobiase extracted from *Aspergillus terreus* characterized as having a Ki dissociation constant of 3.5×10^{-3}M for glucose and a Km affinity of 4×10^{-4}M for cellulose.

4,487,832

PROCESS FOR MAKING N-BUTYL BUTYRATE

Robert E. Heady, Park Forest, Ill., and Jorge H. Alonso, Montvale, N.J., assignors to CPC International Inc., Englewood Cliffs, N.J.

Filed Nov. 18, 1982, Ser. No. 442,807
Int. Cl.³ C12P 7/62
U.S. Cl. 435—135 10 Claims

1. A process for the production of n-butyl butyrate by a fermentation reaction which comprises first passing a fermentation medium containing solvent-producing cells of *C. acetobutylicum* through a bed of activated carbon whereby n-butyl butyrate is formed and adsorbed on the activated carbon, then desorbing the n-butyl butyrate from the carbon, and finally separating the n-butyl butyrate from other compounds desorbed from the carbon.

4,487,833

METHOD OF PREPARING HYBRIDOMAS AND OF PURIFYING IMMUNOGENIC MATERIALS

Patricia K. Donahoe, Weston; Gerald P. Budzik, Waltham, and Meredith Mudgett-Hunter, Hyde Park, all of Mass., assignors to The General Hospital Corporation, Boston, Mass.

Filed Mar. 1, 1982, Ser. No. 353,089
Int. Cl.³ C12N 15/00, 5/00, 5/02; C12P 21/00; G01N 33/54
U.S. Cl. 435—172.2 21 Claims

1. In a method for preparing a hybridoma which secretes antibodies against an immunogenic material, comprising sensitizing an appropriate source with an immunizing amount of a preparation of said immunogenic material, obtaining from said source lymphocytes having immune activity against said immunogenic material, fusing said lymphocytes with an apropriate cell line to thereby form mixed hybridomas, and selecting said mixed hybridomas in the presence of said lymphocytes and said cell line, the improvement wherein:

said immunogenic material is present in said immunizing preparation in an amount not larger than 5% by weight, and wherein, after selection of said mixed hybridomas but prior to cloning, the method comprises the steps of:

raising ascites fluid with said mixed hybridomas, then detecting immune specificity against said immunogenic material in said ascites raised fluid; and thereafter cloning the ascites raised cells which show immune specificity againat said material.

17. An in vitro composition consisting essentially of a continuous hybridoma cell line which secretes antibodies specific for MIS.

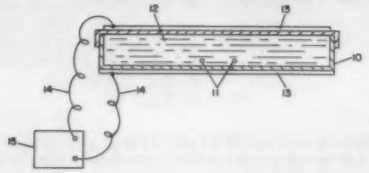
4,487,834

ELECTRICAL STIMULATION OF ARTICULAR CHONDROCYTES

Carl T. Brighton, Malvern, Pa., assignor to Biolectron, Inc., Hackensack, N.J.

Filed Sep. 17, 1982, Ser. No. 419,432
Int. Cl.³ C12N 13/00, 5/00
U.S. Cl. 435—173 4 Claims

1. A method of stimulating growth in articular chondrocytes comprising noninvasively subjecting said chondrocytes to an externally applied, capacitively coupled alternating current



electric field having a frequency of about 60 KHz and at a current density in the range of about 15-145 $\mu A/cm^2$.

4,487,835

PLASMID HAVING TEMPERATURE DEPENDENT PLASMID COPY NUMBER

Bernt E. Uhlin; Kurt Nordström; Soeren Molin, and Petter Gustaffson, all of Odense, Denmark, assignors to A/S Alfred Benzon, Copenhagen, Denmark

Division of Ser. No. 908,108, May 22, 1978,. This application Dec. 8, 1980, Ser. No. 214,423
Claims priority, application Fed. Rep. of Germany, Dec. 30, 1977, 2759053
Int. Cl.³ C12N 1/00, 15/00
U.S. Cl. 435—317 9 Claims

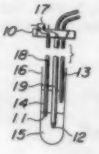
1. A recombinant DNA plasmid showing a controlled constant plasmid copy number when host bacteria carrying the plasmid are cultivated at one temperature, and showing, when the host bacteria carrying the plasmid are grown at a different temperature, an altered plasmid copy number control allowing an at least 20 times higher or totally uncontrolled copy number.

4,487,836

METHOD AND APPARATUS FOR DETECTING BOUNDARY SURFACE BETWEEN BLOOD PLASMA AND BLOOD CORPUSCLE SUSPENSION

Akitoshi Takayanagi, Kawasaki, and Tokio Kano, Akishima, both of Japan, assignors to Olympus Optical Co. Ltd., Japan

Filed Jul. 27, 1982, Ser. No. 402,743
Claims priority, application Japan, Aug. 3, 1981, 56-121722
Int. Cl.³ G01N 27/02, 33/48
U.S. Cl. 436—2 15 Claims



1. A method for detecting a boundary surface between a blood plasma and a blood corpuscle suspension of a sample contained in a vessel comprising:

immersing a pair of electrodes into the sample;

applying an AC voltage across said electrodes having a frequency such that the impedance between the electrodes is in a β-dispersion region where the impedance of the blood plasma is substantially different from that of the blood corpuscle suspension;

moving the electrodes relative to the samiple while the electrodes are immersed in the sample; and

detecting an abrupt change in the impedance across said

electrodes in order to detect the boundary surface between the blood plasma and blood corpuscle suspension in said sample.

4,487,837

RADIATION METHOD FOR DETERMINING BRINE TOLERANT SURFACTANTS IN COMPLEX MIXTURES

Kirk D. Schmitt, Pennington, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 10, 1981, Ser. No. 329,479
Int. Cl.[3] E21B *43/20*
U.S. Cl. 436—27 1 Claim

1. A method for controlling the concentration of a brine tolerant sulfonate surfactant in a recovered complex fluid mixture containing, in addition to said sulfonate surfactant, lignosulfonates, crude oil, salts and water and, optionally, petroleum sulfonates and alcohols, that comprises: (1) incorporating into the sulfonate surfactant molecule a small amount of tritium prior to addition of the complex mixture, (2) adding the tritium modified surfactant to said complex mixture, (3) determining the concentration of the brine tolerant sulfonate surfactant in recovered complex mixture fluid by measuring its radioactivity and (4) optimizing the concentration of the brine tolerant sulfonate in said recovered complex mixture in response to the determined concentration of the tritium incorporated sulfonate therein by adding neither too much nor too little brine tolerant sulfonate to said complex mixture.

4,487,838

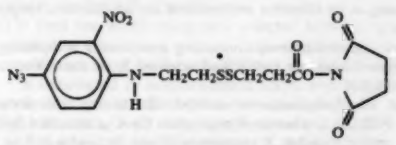
RADIO-LABELLED CROSS-LINKING REAGENTS

Richard O. Hynes, Belmont, and Martin A. Schwartz, Boston, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jan. 12, 1982, Ser. No. 338,946
Int. Cl.[3] G01N *33/58*; C07C *117/00*; G01N *21/75, 33/60*
U.S. Cl. 436—504 11 Claims

1. A crosslinking reagent comprising;
(a) a first functional group capable of forming a covalent derivative with a material of interest;
(b) a second functional group capable of forming an in situ bond to a neighboring material upon photolysis,
(c) a chemically cleavable bond separating said first and second groups; and
(d) label means for labelling the neighboring material after cleavage of said bond, whereby in situ protein interactions can be studied.

10. A reagent having the following formula:



where S is a radioisotope of sulfur.

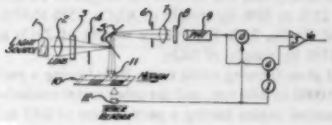
4,487,839

IMMUNOASSAY METHODS EMPLOYING PATTERNS FOR THE DETECTION OF SOLUBLE AND CELL SURFACE ANTIGENS

Louis A. Kamentsky, Weston, Mass., assignor to Ortho Diagnostic Systems Inc., Raritan, N.J.

Filed Jan. 5, 1983, Ser. No. 455,765
Int. Cl.[3] G01N *33/52, 33/58*
U.S. Cl. 436—518 64 Claims

1. A method for determining the presence of antigens in an aqueous sample comprising the steps of:
(a) providing surface means having first antibodies, specific for the antigens to be determined, associated therewith in a specified pattern of areas, each area alternating with the presence and absence of said first antibodies;
(b) further providing an aqueous solution containing a known quantity of labeled antigens having substantially the same reactivity with said first antibodies as the antigens to be determined;
(c) contacting the aqueous sample and the aqueous solution with said surface means under conditions appropriate for permitting an immunological reaction to occur whereby said labeled and sample antigens compete for binding sites on said first antibodies;
(d) illuminating at least one first area having first antibodies associated therewith and detecting the effect of said illumination on said label associated with said area by detection



means for providing a first signal responsive to the presence of said labeled antigens;
(e) translocating said surface means with respect to said detector means and further illuminating at least one second area having an absence of first antibodies associated therewith and detecting the effect of said illumination on said label associated with said area whereby a second signal responsive to the presence of said labeled antigens is provided; and
(f) analyzing said first and second signals whereby the presence of antigens in said aqueous sample may be determined based on the relative absence or presence of bound labeled antigen in said first area in comparison to said second area.

4,487,840

USE OF SILICON IN LIQUID SINTERED SILICON NITRIDES AND SIALONS

Rishi Raj, and Sunggi Baik, both of Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Jun. 21, 1983, Ser. No. 506,466
Int. Cl.[3] C04B *35/58*
U.S. Cl. 501—97 7 Claims

1. A composition adapted to form ceramics having a high density which comprises:
(a) At least about 83% of at least one finely divided pulverulent nitrogen based ceramic forming material, said finely divided nitrogen based ceramic forming material having an average particle size ranging from 0.1 μm to about 10.0 μm.
(b) A minor pulverulent liquid phase forming amount of liquid phase forming additive; and
(c) A minor densification enhancing amount of pulverulent silicon.

4,487,841

MATERIAL FOR PLASMA SPRAYING AND METHOD OF MAKING SAME

Miloslav Bartuska; Petr Kroupa; Josef Szabo, and Karel Zverina, all of Prague, Czechoslovakia, assignors to Vysoka skola chemicko-technologicka, Prague, Czechoslovakia

Continuation of Ser. No. 155,078, Jun. 2, 1980, abandoned. This application Feb. 12, 1982, Ser. No. 348,227
Int. Cl.[3] C04B *35/04, 35/10, 35/12, 35/14*
U.S. Cl. 501—105 5 Claims

1. In a spraying material for hot or plasma spraying consisting of several metal oxides of which at least one oxide is a glass-forming oxide, the improvement wherein the material is

formed by agglomerates selected from one of the groups consisting of:

(1) 50% to 80% by weight of CaO, 1% to 5% by weight of MgO, and 18% to 45% by weight of SiO_2;

(2) 50% to 90% by weight of MgO, 1% to 5% by weight of CaO, and 5% to 45% by weight of SiO_2;

(3) 90% to 95% by weight of Cr_2O_3, 2% to 8% by weight of TiO_2, and 1% to 3% by weight of SiO_2;

(4) 65% to 75% by weight of Cr_2O_3, 20% to 30% by weight of MgO, and 2% to 10% by weight of SiO_2;

(5) 30% to 40% by weight of Al_2O_3, 15% to 25% by weight of CaO, and 35% to 50% by weight of SiO_2;

(6) 25% to 30% by weight of Al_2O_3, 40% to 45% by weight of BaO, and 25% to 35% by weight of SiO_2;

(7) 46% to 51% by weight of Al_2O_3, 33% to 41% by weight of ZrO_2, and 8% to 21% by weight of SiO_2; and

(8) 25% to 30% by weight of Al_2O_3, 25% to30% by weight of Cr_2O_3, 25% to 30% by weight of ZrO_2 and 10% to 25% by weight of SiO_2;

said glass-forming oxide being SiO_2 having a particle size of 0.0002 to 0.04 mm, and the other metal oxides being fundamental oxides having a particle size of 0.01 to 0.2 mm.

4,487,842

LOW-LOSS MICROWAVE DIELECTRIC MATERIAL

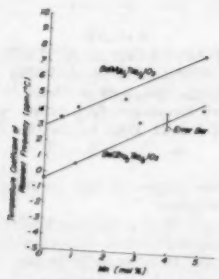
Shoichiro Nomura, Tokyo, and Yoshihiro Konishi, Sagamihara, both of Japan, assignors to Nippon Hoso Kyokai, Tokyo, Japan

Filed May 18, 1983, Ser. No. 495,807

Claims priority, application Japan, May 26, 1982, 57-88066

Int. Cl.³ C04B *35/00*

U.S. Cl. 501—135 **17 Claims**



1. A low-loss microwave dielectric ceramic consisting essentially of a sinter of a mixture of a perovskite type structure compound oxide having a porosity in the range of 1 to 3% consisting essentially solely or mainly of at least one member selected from the group consisting of $Ba(Zn_{\frac{1}{3}}Ta_{\frac{2}{3}})O_3$ and $Ba(Mg_{\frac{1}{3}}Ta_{\frac{2}{3}})O_3$ with Mn having an amount within the range of 0.5–5 mol %.

10. A process for preparing a low-loss microwave dielectric ceramic comprising the steps of:

(1) adding a small amount from 0.5 to 5 mol % of Mn to a perovskite type structure compound oxide powder consisting essentially singly or mainly of at least one member selected from the group consisting of $Ba(Zn_{\frac{1}{3}}Ta_{\frac{2}{3}})O_3$ and $Ba(Mg_{\frac{1}{3}}Ta_{\frac{2}{3}})O_3$

(2) calcining the resultant mixture under a temperature within a range of 1200°–1400° C. to form Mn-treated oxide powder, and

(3) sintering said Mn-treated oxide powder at a temperature within a range of 1550°–1600° C. for 1–3 hours.

4,487,843

CATALYTIC ACTIVITY OF ALUMINOSILICATE ZEOLITES

Clive D. Telford, Ascot, and Dennis Young, Staines, both of England, assignors to British Petroleum Company, p.l.c., London, England

Filed Feb. 13, 1984, Ser. No. 579,721

Claims priority, application United Kingdom, Mar. 9, 1983, 8306532

Int. Cl.³ B01J *37/10*

U.S. Cl. 502—85 **9 Claims**

1. A process for activating an aluminosilicate loaded with a compound of a metal from Group IIIB of the Periodic Table said process comprising bringing into contact the unloaded zeolite with steam at an elevated temperature prior to loading thereof with a compound of a metal from Group IIIB of the Periodic Table.

2. A process according to claim **1** wherein the aluminosilicate has a silica to alumina ratio greater than 5:1.

3. A process according to claims **1** or **2** wherein the Group IIIB metal is selected from aluminium, gallium, indium and thallium.

4,487,844

BENZENEDIAZONIUM TETRAFLUOROBORATE/TITANIUM TETRAHALIDE-BASED CATALYSTS

Robert M. Parlman, and Charles M. Selman, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 22, 1983, Ser. No. 525,517

Int. Cl.³ C08F *4/64*

U.S. Cl. 502—104 **18 Claims**

1. A process for producing a catalyst system comprising:

(a) contacting a benzenediazonium tetrafluoroborate with a titanium tetrahalide to produce a catalyst component; and

(b) combining said catalyst component with a cocatalyst selected from at least one of organometal compounds and organoboron compounds.

4,487,845

METHOD OF ENHANCING STEREOSPECIFICITY OF A CATALYST SYSTEM

Kelly B. Triplett, Stamford, Conn., assignor to Stauffer Chemical Company, Westport, Conn.

Filed May 9, 1980, Ser. No. 148,336

Int. Cl.³ C08F *4/64*

U.S. Cl. 502—107 **39 Claims**

14. A process for producing a catalyst system comprising treating at an effective temperature for an effective length of time:

(i) an organoaluminum-containing component comprising an organoaluminum compound selected from the group consisting of

(a) alkylhaloaluminum compounds having the formula AlR_nX_{3-n}, wherein R represents C_1–C_{14} saturated hydrocarbon residue, X represents Cl and Br, and n is 2 or 1.5;

(b) alkyl aluminum compounds having the formula $AlR_n(OR')_{3-n}$ wherein R and n are as defined above and R' represents C_{1-14} saturated hydrocarbon residue; and

(c) trialkyl aluminums having the formula AlRR'R", where R, R' and R" are the same or different and respectively represent a C_{1-14} saturated hydrocarbon residue;

and an electron donor compound selected from the group consisting of amines, amides, ethers, esters, ketones, nitriles, phosphines, stilbines, arsines, phosphoramides, thioethers, aldehydes, alcoholates, and organic acid salts of metals belonging to the first four groups of the Periodic Table; and

(ii) a titanium halide-containing component obtained by contacting a titanium halide compound or complex of the titanium halide compound and an electron donor compound with a support which comprises as the essential support material thereof an anhydrous dihalide of magnesium or manganese;

the combination of effective temperature and effective time being sufficient to produce a catalyst system having enhanced stereospecificity.

4,487,846

PROCESS FOR THE PREPARATION OF CATALYST SUPPORTS FOR THE POLYMERIZATION OF ALPHA-OLEFINS AND THE SUPPORTS OBTAINED

Jean C. Bailly, Martigues, and Joelle Collomb, Marseilles, both of France, assignors to BP Chimie Society Anonyme, Courbevoie, France

Filed Jun. 16, 1983, Ser. No. 505,076
Claims priority, application France, Jun. 24, 1982, 82 11054
Int. Cl.³ C08F 4/02
U.S. Cl. 502—154 **21 Claims**

1. Catalyst supports for the polymerisation and co-polymerisation of alpha-olefins, especially ethylene and propylene, consisting essentially of magnesium chloride, characterised by that they contain a chlorinated compound of aluminium in a quantity such that the atomic ratio of Al:Mg is comprised between 0.001 and 0.1 and that they occur in the form of spheroidal particles having a mean diameter by mass, Dm, comprised between 10 and 100 microns and a narrow and controllable particle size distribution such that the ratio of the mean diameter by mass Dm to the mean diameter by number Dn of the particles is below or equal to 3.

4,487,847

ETHYLENE DIMERIZATION

Ronald D. Knudsen, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 25, 1983, Ser. No. 517,108
Int. Cl.³ B01J 31/24
U.S. Cl. 502—155 **7 Claims**

1. A composition consisting essentially of:

(a) at least one nickel compound selected from the group consisting of:
bis(1,5-cyclooctadiene)nickel(O),
bis(tricyclohexylphosphine)nickel(O),
cyclododecatriene)nickel, and
bis(ethylene)(dicyclohexylphosphine)nickel;

(b) a phosphine compound of the formula PR_3 wherein each R independently represents H or a C_1 to C_{20} hydrocarbyl radical with the proviso that any alkenyl substitution be at least 3 carbon atoms removed from the phosphorus atom and at least one R is not H; and

(c) at least one acidic compound selected from the groups consisting of:
a sulfonic acid of the formula $R'SO_3H$ wherein R' is H, or a fluorinated or nonfluorinated alkyl, aryl, alkaryl, or aralkyl radical with 1–10 carbon atoms;

such that the molar ratio of (b) to (a) is about 0.01–4.0 to 1 and the molar ratio of (c) to (a) is about 0.01–10.0 to 1.

4,487,848

INDIUM-CONTAINING CATALYST FOR REFORMING HYDROCARBONS

Delmar W. Robinson, Palatine; Russell W. Johnson, Villa Park, and Mark D. Moser, Hoffman Estates, all of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Jun. 2, 1983, Ser. No. 500,520
Int. Cl.³ B01J 27/04, 27/08, 27/10
U.S. Cl. 502—223 **11 Claims**

1. A catalyst composition comprising a platinum group component, a tin component, an indium component and a halogen component with a porous support material, wherein there is about 0.6 or more wt. %, on an elemental basis, indium present.

4,487,849

CATALYST FOR THE REVERSE DISPROPORTIONATION PROCESS

Charles F. Hobbs, Des Peres, Mo., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 403,256, Jul. 29, 1982, Pat. No. 4,439,626. This application Jan. 16, 1984, Ser. No. 571,290
Int. Cl.³ B01J 23/04, 23/72
U.S. Cl. 502—244 **7 Claims**

1. A catalyst consisting essentially of catalytically-effective amounts of copper, tungsten, and an alkali or alkaline earth component on a carrier material.

4,487,850

CATALYSTS FOR THE OXIDATION AND AMMOXIDATION OF OLEFINS

Tao P. Li, Chesterfield, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 568,774, Jan. 6, 1984, abandoned, which is a continuation-in-part of Ser. No. 430,053, Sep. 30, 1982, abandoned. This application Apr. 9, 1984, Ser. No. 598,130
Int. Cl.³ B01J 21/08, 23/84, 23/88
U.S. Cl. 502—249 **14 Claims**

1. A catalyst containing antimony, uranium, iron, bismuth, and molybdenum in a catalytically active oxidized state useful for the oxidation and ammoxidation of olefins represented by the empirical formula:

$$Sb_aU_bFe_cBi_dMo_eO_f$$

where a is 1 to 10, b is 0.1 to 5, c is 0.1 to 5, d is 0.001 to 0.1, e is 0.001 to 0.2, f is a number taken to satisfy the valence requirements of Sb, U, Fe, Bi, and Mo in the oxidation states in which they exist in the catalyst, the catalysts being prepared by

(a) preparing a hydrated mixed oxides component containing antimony, uranium, iron, and bismuth by the steps of
(i) forming a mixture of oxides or nitrates of bismuth and uranium and an oxide of antimony in nitric acid,
(ii) heating the mixed oxides mixture at a temperature and for a time sufficient to induce formation of crystalline oxides of antimony,
(iii) adding an aqueous solution of ferric nitrate to the mixed oxides mixture,
(iv) adjusting the pH of the mixed oxides mixture to about 8, thereby forming a hydrated mixed oxide precipitate in an aqueous phase,
(v) separating the hydrated mixed oxides from the aqueous phase;

(b) forming an aqueous slurry of the hydrated mixed oxides component;

(c) adjusting the pH of the hydrated mixed oxides component slurry to about 9;

(d) adding a molybdate to the hydrated mixed oxides component slurry;

(e) adjusting the pH of the hydrated mixed oxides component-molybdate component slurry to about 8–9;

(f) forming the hydrated mixed oxides component-molybdate component slurry into dry particles; and

(g) calcining the dry particles to form the active catalyst.

4,487,851

CATALYST COMPOSITION FOR CONVERSION OF SYNTHESIS GAS TO HYDROCARBONS

Malcolm P. Heyward, Frimley, and Dennis Young, Staines, both of England, assignors to British Petroleum Company, p.l.c., London, England

PCT No. PCT/GB82/00210, § 371 Date Feb. 22, 1983, § 102(e) Date Feb. 22, 1983, PCT Pub. No. WO83/00326, PCT Pub. Date Feb. 3, 1983

Pub. Date Jul. 15, 1982, Ser. No. 474,577

Claims priority, application United Kingdom, Jul. 17, 1981, 8122174; Nov. 19, 1981, 8134856

Int. Cl.[3] C07L *1/04*

U.S. Cl. 518—728 15 Claims

1. In a process for converting synthesis gas to hydrocarbons by contacting said synthesis gas with a catalyst composition, the improvement which comprises that the catalyst composition comprises an oxide of at least one metal selected from gallium and indium, and contains an oxide of at least one additional metal selected from Group VIII and the B group elements of Group I–VII including the Lanthanides and Actinides of the Periodic Table of Elements, and wherein the catalyst composition optimally contains a further component capable of acting as support.

4,487,852

MODIFIED MANNICH CONDENSATES AND MANUFACTURE OF RIGID POLYURETHANE FOAM WITH ALKOXYLATION PRODUCTS THEREOF

Michael E. Brennan, and George P. Speranza, both of Austin, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Oct. 25, 1983, Ser. No. 545,421

Int. Cl.[3] C08G *18/14, 18/32*

U.S. Cl. 521—167 10 Claims

1. An alkoxylation product of a Mannich condensate prepared by reacting a phenolic component with 1 to 3 mols of formaldehyde and 1 to 3 mols of an amine mixture per mol of said phenolic component and thereafter reacting said Mannich condensate with from about 20 to about 50 wt.% of an alkylene oxide component, said phenolic component comprising phenol or a phenol substituted with an alkyl group containing 1 to 12 carbon atoms, said amine mixture consisting of about 90 to 99 mol percent of diethanolamine and, correspondingly, about 10 to 1 mol percent of melamine, said alkylene oxide component comprising from 90 to 100 wt.% of propylene oxide and, correspondingly, from 0 to 10 wt. percent of ethylene oxide.

4. A method of preparing a polyol composition which comprises preparing a Mannich condensate by reacting a phenolic component with formaldehyde and an amine mixture in the molar ratio of about 1 to about 3 mols of formaldehyde and from about 1 to about 3 mols of amine mixture per mol of said phenolic component, while removing by-product water of reaction, and thereafter reacting the said Mannich condensate with from about 20 to about 50 wt.% of an alkylene oxide component comprising from 100 to about 90 wt.% of propylene oxide and from 0 to about 10 wt.% of ethylene oxide, said amine mixture consisting of about 90 to about 99 mol percent of diethanolamine and from about 10 to about 1 mol percent of melamine, said phenolic component comprising phenol or an alkylphenol having an alkyl group containing 1 to 12 carbon atoms.

7. A method of preparing a rigid polyurethane foam composition having improved fire retardancy properties which comprises:

reacting an excess of an aromatic polyisocyanate with a polyol component in the presence of a catalyst, a blowing agent, a surfactant and a fire retardant;

said polyol component comprising 100 to about 40 wt.% of an alkoxylation product of an alkylene oxide component and a Mannich condensate component, said alkoxylation product having a hydroxyl number of about 400 to about 550 and, correspondingly, from 0 to about 60 wt.% of a condensate of an initiator having 2 to 6 carbon atoms with an alkylene oxide component, said condensate having a hydroxyl number of about 200 to about 800;

said Mannich Condensate Component having been prepared by reacting a phenolic component with formaldehyde and an amine mixture in the molar ratio of about 1 to about 3 mols of formaldehyde and about 1 to about 3 mols of said amine mixture per mol of phenolic component

said amine mixture consisting of 90 to 99 mol percent of diethanolamine and, correspondingly, from 10 to 1 mol percent of melamine;

said phenolic component comprising phenol or phenol substituted with an alkyl group constaining 1 to 12 carbon atoms,

said alkylene oxide component comprising 100 to about 90 wt.% of propylene oxide and, correspondingly, from 0 to about 10 wt.% of ethylene oxide.

4,487,853

LOW ETHYLENE OXIDE/HIGH PRIMARY HYDROXYL CONTENT POLYETHER-ESTER POLYOLS AND POLYURETHANE FOAMS BASED THEREON

Curtis J. Reichel; William W. Levis, Jr., both of Wyandotte, and Louis C. Pizzini, Grosse Ile, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 27, 1983, Ser. No. 565,310

Int. Cl.[3] C08G *18/14, 18/42;* C07C *69/52*

U.S. Cl. 521—172 6 Claims

1. A process for the preparation of a high primary hydroxyl content polyether-ester polyol which comprises reacting at a temperature of 50° C. to 125° C.

(a) a condensate of a polyhydric alcohol containing from 2 to 8 hydroxy groups and an equivalent weight ranging from 30 to 45 and an alkylene oxide containing from 2 to 4 carbon atoms and mixtures thereof said condensate having an equivalent weight of 500 to 10,000 and said condensate reacted with a cyclic organic acid anhydride, forming a half acid ester and

(b) ethylene oxide, in the presence of an effective amount of an amine or oxide or salt of a divalent metal catalyst wherein the ratio of equivalents of the anhydride to equivalents of the condensate range from about 1:1 to about 1:2 and wherein the ratio of moles of ethylene oxide to moles of anhydride range from about 2:1 to about 1.5:1.

4,487,854

POLYOXYALKYLENE POLYETHER POLYOLS AND POLYURETHANE FOAMS PREPARED THEREFROM

Robert J. Hartman, Southgate, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 27, 1983, Ser. No. 565,311

Int. Cl.[3] C08G *18/14, 18/32*

U.S. Cl. 521—174 9 Claims

1. A polyoxyalkylene polyether polyol having a hydroxyl number of about 20 to 200 and functionality of 2.5 to 8 comprising the reaction product of

(a) an organic initiator compound having from 2 to 8 active hydrogen groups and 2 to 12 carbon atoms and an equivalent weight ranging from about 30 to about 50,

(b) an ethylene oxide adduct adjacent to the initiator comprising from 1 to 30 weight percent based on the total weight of the polyol, and

(c) a subsequent alkylene oxide adduct selected from the group consisting of propylene oxide, butylene oxide and a heteric mixture of ethylene oxide and propylene oxide provided that the ethylene oxide content does not exceed 30 weight percent based on the weight of the polyol and further provided that when the heteric mixture is employed a further addition of propylene oxide is made to cap the product.

4. A process for the preparation of a polyoxyalkylene poly-

ether polyol having a hydroxyl number of about 20 to 200 and functionalities of 2.5 to 8 comprising the steps of reacting

(a) an organic initiator compound having from 2 to 8 active hydrogen groups, 2 to 12 carbon atoms and an equivalent weight ranging from 30 to 50,

(b) ethylene oxide in an amount from 1 to 20 weight percent based on the total weight of the polyol, and

(c) alkylene oxide selected from the group consisting of propylene oxide, butylene oxide and a mixture of ethylene oxide and propylene oxide provided that the total ethylene oxide content does not exceed 30 weight percent based on the weight of the polyol, in the presence of a catalyst.

4,487,855

COLORED LATEXES; METHODS FOR MAKING SAME AND COLORED FINELY DIVIDED PRODUCTS

Yen-Jer Shih, 30 Marvin La., Piscataway, N.J. 08854; Mohamed S. El-Aasser, 2345 Edgewood Ave., Bethlehem, Pa. 18017, and John W. Vanderhoff, 345 Ninth Ave., Bethlehem, Pa. 18018

Filed Feb. 15, 1983, Ser. No. 466,598

Int. Cl.³ C08F *8/30*

U.S. Cl. 523—201 **22 Claims**

1. A colored polymer produced by reacting a compound (A), which is capable of coupling to an aromatic diazonium compound (B), with a polymer (C) suspended in aqueous latex form and containing a reactive halogen group capable of reacting with said compound (A) and thereafter coupling the resulting reaction product in said latex to said aromatic diazonium compound (B) to produce said colored polymer containing an azo chromophore.

4,487,856

ETHYLENE POLYMER COMPOSITE HEAT STORAGE MATERIAL

Albert G. Anderson, Wilmington, and Edward G. Howard, Jr., Hockessin, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 14, 1983, Ser. No. 475,077

Int. Cl.³ C08K *9/00*

U.S. Cl. 523—205 **15 Claims**

1. Composite consisting essentially of, by weight, with the total being 100%:

(a) about 30–55% of an organic latent heat material having at least one latent heat transition, as a solid-solid transition(s) and/or a solid-liquid transition, in the temperature range 0–100° C., and which, when liquid, wets the surface of the filled ethylene polymer of (b); and

(b) about 45–70% of filled ethylene polymer consisting of ethylene polymer and finely divided (particulate) solid filler, substantially all of the ethylene polymer being deposited on the surface of the finely divided filler and substantially all of the filler having ethylene polymer deposited on its surface.

4,487,857

PROCESS FOR PRODUCING THERMOPLASTIC RESIN

Teruhiko Sugimori, and Noriyuki Tajiri, both of Ohtake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Jul. 20, 1983, Ser. No. 515,663

Claims priority, application Japan, Jul. 30, 1982, 57-134115; Jul. 30, 1982, 57-134116; Aug. 27, 1982, 57-148878

Int. Cl.³ C08F *6/00*; C08G *6/00*; C08J *3/00*

U.S. Cl. 523—335 **7 Claims**

1. A process for producing a thermoplastic resin by coagulating a thermoplastic resin latex prepared by emulsion polymerization comprising coagulating the latex in a range of temperature lower than the solidifying point of the thermoplastic resin, thereby forming a slurry; adding an alkaline substance to the thus obtained slurry at temperatures lower than said solidifying point to adjust the pH 0.1 or more higher than at the time of coagulation and to a pH to 7 or less, and then raising the temperature of said slurry to solidify the coagulated particles.

4,487,858

BLENDING TEMPERATURE SENSITIVE COMPONENTS INTO A SILICONE MODIFIED THERMOPLASTIC

Eric M. Lovgren, Westerlo; Joseph C. Golba, Jr., Ballston Spa, and Randall A. Reed, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 7, 1983, Ser. No. 540,079

Int. Cl.³ C08J *3/20*; C08K *5/54*; C08L *23/12*

U.S. Cl. 523—348 **15 Claims**

1. A method of continuously producing a thermoplastic/silicone fluid blend comprising:

a. blending a high viscosity silicone fluid having a viscosity of at least 90,000 centipoise at ambient temperature and a primary thermoplastic composition comprising one or more thermoplastic polymers within an extruder at a blending temperature sufficiently high to melt said primary thermoplastic composition, the weight ratio of said primary thermoplastic composition to said high viscosity silicone fluid providing a value in the range of 100 to 1;

b. feeding in a manner as to achieve some cooling of the blend of step a, one or more additives sensitive to said blending temperature with a secondary thermoplastic composition comprising one or more solid thermoplastic polymers into said extruder downstream of the point where the blending in step A originates, the weight ratio of the secondary thermoplastic composition and the blend of step A providing a value in the range of 1 to 0.01; and

c. blending said blend of step A with the secondary thermoplastic composition and the additives of step B.

4,487,859

SELF-CURING WATER DISPERSED POLYMERS

Phillip C. Martino, Brunswick, Ohio, assignor to SCM Corporation, New York, N.Y.

Filed Nov. 21, 1983, Ser. No. 553,557

Int. Cl.³ C08F *20/56, 30/02*; C09D *3/74, 5/02*

U.S. Cl. 523—406 **12 Claims**

1. A water dispersed coating composition containing a polymeric binder, the binder polymer comprising copolymerized ethylenically unsaturated monomers and on polymeric solids weight basis:

copolymerized monomers comprising between 1% and 20% alkylated alkylol acrylamide monomer, between 1% and 15% functional monomer selected from reactive carboxyl, hydroxyl, amine, or amide functional group monomer, and between 0.1% and 10% phosphate monomer, with the balance being other ethylenically unsaturated monomer.

4,487,860

AQUEOUS SELF-CURING POLYMERIC BLENDS

Peter P. Winner, North Royalton, and James T. K. Woo, Medina, both of Ohio, assignors to SCM Corporation, New York, N.Y.

Filed Dec. 5, 1983, Ser. No. 558,292

Int. Cl.³ C08L *63/00*; C09D *5/02*

U.S. Cl. 523—408 **18 Claims**

1. A water-dispersed coating composition containing an intermixture of water-dispersed polymers comprising on a polymer solids weight basis:

between 1% and 70% of resinous polyelectrolyte copolymer produced by copolymerizing ethylenically unsaturated monomers, including carboxyl or hydroxyl functional group monomer in water containing an ionizing agent wherein at least 20% by weight of said carboxyl or hydroxyl functional groups are ionized by said ionizing agent;

between 5% and 99% of a reactive self-curing polymer containing copolymerized ethylenically unsaturated mon-

omers comprising (i) alkylol acrylamide, (ii) functional monomers comprised of reactive carboxy, hydroxyl, amine, or amide, and (iii) other ethylenically unsaturated monomers; and

between 0% and 50% phosphated polymer.

4,487,861

AQUEOUS POLYMERIC BLENDS

Peter P. Winner, North Royalton, Ohio, assignor to SCM Corporation, New York, N.Y.

Filed Nov. 28, 1983, Ser. No. 555,354
Int. Cl.³ C09D 5/02; C08L 63/00
U.S. Cl. 523—428. 8 Claims

1. A water-dispersed coating composition comprising a polymeric mixture comprising on a polymer solids weight basis:

between 20% and 80% epoxy-acrylic copolymer wherein said epoxy-acrylic copolymer is an epoxy-acrylic graft copolymer prepared by in-situ polymerization of ethylenically unsaturated monomers in the presence of epoxy or an epoxy-acrylic ester graft copolymer produced by esterifying carboxy functional polymer with an epoxy resin in the presence of amine catalyst; and

between 20% and 80% epoxy phosphate ester containing between 0.05% and 5% by weight of coreacted phosphoric acid.

4,487,862

THERMOSETTING RESIN COMPOSITION FOR INJECTION MOLDING AND ARTICLE FORMED BY USING THE COMPOSITION

Kazuo Maruya, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Feb. 28, 1983, Ser. No. 470,373
Claims priority, application Japan, Mar. 12, 1982, 57-38066; Mar. 12, 1982, 57-38065
Int. Cl.³ C08K 3/32
U.S. Cl. 523—506 12 Claims

1. A resin composition for injection molding, comprising:

100 parts by weight of a thermosetting resin;

from 5 to 250 parts by weight of a salt of an oxyacid of phosphorous wherein said salt comprises a polyphosphate expressed by the general formula $MO_{m/2}.nP_2O_5$, wherein M represents a metal element including silicon, m represents the valence of the metal element M and n is in the range of from 0.1 to 0.7, or an alkali metal salt of said phosphate; and

from 15 to 245 parts by weight of a filler, the total amount of said salt of the oxyacid and said filler being in the range of from 20 to 250 parts by weight.

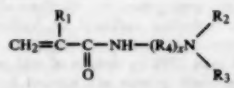
4,487,863

REINFORCED POLYESTER BASED RESIN SYSTEM AND METHOD OF FABRICATION

John C. Goan, Johnson City, Tenn., assignor to Great Lakes Carbon Corporation, New York, N.Y.

Filed Nov. 22, 1982, Ser. No. 443,752
Int. Cl.³ C08L 67/06
U.S. Cl. 523—512 6 Claims

1. In a thermosetting resin system comprising an unsaturated polyester base resin matrix and reinforcing fibers, the improvement comprising the addition of 5 to 30 wt. %, based on the weight of the matrix, of an amino substituted acrylamide monomer having the general formula



where

R_1, R_2 and R_3 are each selected from the group consisting of H and compounds of the formula C_nH_{2n+1}, where n is a numeral in the range of 1 to about 5;

R_4 is selected from the group consisting of CH_2 and aromatic or cycloaliphatic segments; and

x is a numeral in the range of 1 to 5,

to said matrix to improve the bonding strength of said matrix to said reinforcing fibers.

4,487,864

MODIFIED CARBOHYDRATE POLYMERS

Mauricio Bermudez, Miami, Fla., and Alberto L. Torres, Bogata, Colombia, assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 28, 1983, Ser. No. 489,429
Int. Cl.³ C08L 1/00, 1/26, 3/00
U.S. Cl. 524—2 13 Claims

1. A modified carbohydrate polymer composition comprising from about 50 to about 99.95 weight percent of a water-soluble carbohydrate polymer and from about 0.05 to about 50 weight percent of a crosslinked, water-swellable, nonflocculating partially hydrolyzed polyacrylamide wherein the polyacrylamide has a Flocculation Index of at least 0.60.

4,487,865

POLYMERIC ARTICLES MODIFIED WITH HYALURONATE

Endre A. Balazs, Riverdale, N.Y.; David J. Wedlock, Cheshire, England, and Glyn O. Phillips, Mold, Wales, assignors to Biomatrix, Inc., Ridgefield, N.J.

Filed Dec. 15, 1983, Ser. No. 561,817
Int. Cl.³ C08F 8/00
U.S. Cl. 524—29 5 Claims

1. A composition of matter comprising poly (2-hydroxy ethyl methacrylate) modified by the inclusion therein of hyaluronic acid or a salt thereof.

4,487,866

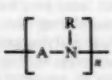
METHOD OF IMPROVING THE DISPERSIBILITY OF WATER SOLUBLE ANIONIC POLYMERS

Stephen W. Almond, and Edith Scott, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Jun. 22, 1983, Ser. No. 506,580
Int. Cl.³ C08L 1/26, 1/28; E21B 43/25
U.S. Cl. 524—42 20 Claims

1. A method of rendering water soluble anionic polymers having a molecular weight sufficient to increase the viscosity of an aqueous liquid more dispersible in water said anionic polymers selected from the group consisting of gum karaya, gum tragacanth, gum ghatti, gum acacia, psyllium, carrageenin, carboxyalkyl guar, wherein said alkyl group has from 1 to about 3 carbon atoms, carboxyalkyl hydroxyalkyl guar wherein said alkyl groups have from 1 to about 3 carbon atoms, carboxyalkyl cellulose wherein said alkyl group has from 1 to about 3 carbon atoms, carboxyalkyl hydroxyalkyl cellulose wherein said alkyl groups have from 1 to about 3 carbon atoms, polyacrylamide, polyacrylate, acrylamideacrylate copolymers, xanthan gum, and mixtures thereof comprising:

(a) adding to a polar liquid to form a mixture the water soluble anionic polymers and cationic or amphoteric polymers selected from the group consisting of poly(diallyldimethylammonium chloride), repeating monomer units of the formulae:



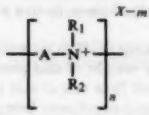
I.

wherein

R is selected from the group consisting of hydrogen and an alkyl having from 1 to 3 carbon atoms;

A is selected from the group consisting of an alkylene having 2 to 4 carbon atoms and a hydroxyalkylene having 2 to 4 carbon atoms;

n is an integer equal to the number of monomer units of said polymer required to give the polymer a molecular weight of at least 1,000;



II.

wherein

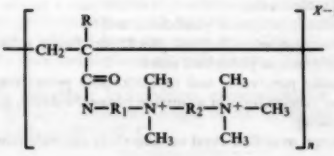
R_1 and R_2 are independently selected from the group consisting of hydrogen and an alkyl having from 1 to 3 carbon atoms;

A is selected from the group consisting of an alkylene having 2 to 4 carbon atoms, a hydroxyalkylene having 2 to 4 carbon atoms;

X is selected from the group consisting of a halogen, sulfate, hydroxyl, and methyl sulfate;

m is an integer equal to the number of anions required to maintain electronic neutrality; and

n is an integer equal to the number of monomer units of said polymer required to give the polymer a molecular weight of at least 1,000;



III.

wherein

R is hydrogen or methyl;

R_1 is an alkylene group having from about 2 to about 5 carbon atoms;

R_2 is an unsubstituted alkylene group having from about 2 to about 6 carbon atoms or a substituted alkylene having from about 2 to about 6 carbon atoms and containing a hydroxyl group or from 1 to about 3 ether groups;

X is an anion selected from the group consisting of chlorine, bromine, iodine, sulfate, hydroxyl, and methyl sulfate;

m is an integer equal to the number of anions required to maintain electronic neutrality; and

n is an integer equal to the number of monomer units of said polymer required to give the polymer a molecular weight of at least 1,000; and, mixtures thereof;

wherein said amphoteric polymers or cationic polymers are present in said mixture in the range of from about 1 to about 75 percent by weight of said anionic polymers; and,

(b) adding the mixture of step (a) and a salt selected from the group consisting of an alkali metal halogen, alkali earth metal halogen, a zinc halogen, an ammonium halogen to an aqueous liquid.

4,487,867

WATER SOLUBLE ANIONIC POLYMER COMPOSITION AND METHOD FOR STIMULATING A SUBTERRANEAN FORMATION

Stephen W. Almond, and Edith Scott, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Jun. 22, 1983, Ser. No. 506,759

Int. Cl.[3] **E21B** *43/25, 43/27;* **C08L** *1/26, 1/28*

U.S. Cl. 524—42 **18 Claims**

1. A water soluble anionic polymer composition comprising:

(a) an anionic polymer having a molecular weight sufficient to thicken water and selected from the group consisting of gum karaya, gum tragacanth, gum ghatti, gum acacia, psyllium, carrageenin, carboxyalkyl guar, wherein said alkyl group has from 1 to about 3 carbon atoms, carboxyalkyl hydroxylalkyl guar wherein said alkyl groups have from 1 to about 3 carbon atoms, carboxyalkyl cellulose wherein said alkyl group has from 1 to about 3 carbon atoms, carboxyalkyl hydroxyalkyl cellulose wherein said alkyl groups have from 1 to about 3 carbon atoms, polyacrylamide, polyacrylate, acrylamide-acrylate copolymers, xanthan gum, and mixtures thereof; and,

(b) a cationic or amphoteric polymer selected from the group consisting of poly(diallyldinoethylammonium chloride), repeating monomer units of the formulae:

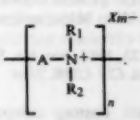
I

wherein

R is selected from the group consisting of hydrogen and an alkyl having from 1 to about 3 carbon atoms;

A is selected from the group consisting of an alkylene having 2 to 4 carbon atoms and a hydroxyalkylene having 2 to 4 carbon atoms;

n is an integer equal to the number of monomer units of said polymer required to give the polymer a molecular weight of at least 1,000;



II

wherein

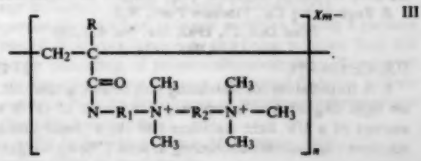
R_1 and R_2 are independently selected from the group consisting of hydrogen and an alkyl having from 1 to about 3 carbon atoms

A is selected from the group consisting of an alkylene having 2 to 4 carbon atoms and a hydroxyalkylene having 2 to 4 carbon atoms;

X is selected from the group consisting of a halogen, sulfate, hydroxyl, and methyl sulfate;

m is an integer equal to the number of anions required to maintain electronic neutrality; and,

n is an integer equal to the number of monomer units of said polymer required to give the polymer a molecular weight of at least 1,000;



III

wherein

R is hydrogen or methyl;

R_1 is an alkylene group having from about 2 to about 5 carbon atoms;

R_2 is an unsubstituted alkylene group having from about 2 to about 6 carbon atoms or a substituted alkylene having from about 2 to about 6 carbon atoms and containing a hydroxyl group or from 1 to about 3 ether groups;

X is an anion selected from the group consisting of chlorine, bromine, iodine, sulfate, hydroxyl, and methyl sulfate;

m is an integer equal to the number of anions required to maintain electronic neutrality; and,

n is an integer equal to the number of monomer units of said polymer required to give the polymer a molecular weight of at least 1,000; and mixtures thereof,

said cationic or amphoteric polymer being present in the range of from about 1 to about 25 percent by weight of said anionic polymer.

4,487,868

FOUNDRY CORE COMPOSITIONS

David R. Armbruster, Forest Park, and Luis R. Rodriguez, Oak Park, both of Ill., assignors to Acme Resin Corporation, Forest Park, Ill.

Filed May 25, 1983, Ser. No. 497,961

Int. Cl.³ C08G *5/04*; C08L *1/28*

U.S. Cl. 524—44 **9 Claims**

1. An acidic curing agent which causes the rapid curing of resin systems containing phenolic resole resins and furfuryl alcohol used in the preparation of foundry cores and molds, which comprises from about 5% to about 60% by weight of an acid salt selected from the group consisting of aluminum nitrate, ferric nitrate and mixtures thereof, from about 2% to about 20% by weight of a water-soluble polymeric polyhydroxy compound, and at least sufficient water to give a homogeneous solution.

4,487,869

SUPER JET BLACK COATINGS

Sol Panush, Farmington Hills, Mich., assignor to Inmont Corporation, Clifton, N.J.

Filed Sep. 23, 1983, Ser. No. 535,020

Int. Cl.³ C08K *5/34*

U.S. Cl. 524—90 **3 Claims**

1. A super jet black coating composition particularly adapted for use as an automotive paint consisting essentially of a polymer component containing at least about 25% by weight of a thermosetting resin including a cross-linking agent, and a pigment component containing at least about 5% by weight of a 1:2 chromium complex of a mono-AZO dye substituted with aminophenol and coupled with 2-napthol, the composition so constituted that after coating on a substrate and the application of sufficient heat to cure the coating, a durable, super jet black composition with depth, clarity and non-bleeding blackness results.

4,487,870

UV STABILIZER SYSTEM AND UV STABILIZED POLYOLEFINS

Kenneth W. Bartz, Baytown, Tex., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Dec. 27, 1982, Ser. No. 453,399

Int. Cl.³ C08K *5/34*, *5/16*

U.S. Cl. 524—91 **23 Claims**

1. A formulation for stabilizing polyolefins against ultraviolet light degradation comprising a mixture of (a) a minor amount of a UV light stabilizer and (b) a major amount of ethylene vinyl acetate containing at least 15% by weight vinyl acetate.

4,487,871

POLYOLEFIN RESIN COMPOSITION

Tadao Ishibashi, and Youichi Kugimiya, both of Ichiharashi, Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Aug. 4, 1983, Ser. No. 520,171

Claims priority, application Japan, Aug. 5, 1982, 57-136660

Int. Cl.³ C08L *23/10*, *23/04*; C08K *5/52*, *5/13*

U.S. Cl. 524—100 **3 Claims**

1. A polyolefin resin composition useful as a base for metallized films comprising a polymeric blend consisting of

(a) a crystalline propylene-alpha-olefin copolymer

(i) containing at least 70% by weight of propylene, and

(ii) having a crystalline melting point of lower than 150° C. with

(b) a high density polyethylene having a density of at least 0.940 g/cm^3,

(c) said blend containing 96–80% by weight of said copolymer and 4–20% by weight of said polyethylene,

(d) the ratio of the melt flow rate of said polyethylene to the melt flow rate of said copolymer being at least 0.7, and

at least one additive selected from the group consisting of phenolic antioxidants and phosphoric antioxidants that have a molecular weight of 500 or more and in an amount of 0.01 to 0.30% by weight based on the weight of the entire composition.

4,487,872

REPOSITIONABLE PRESSURE-SENSITIVE ADHESIVE COMPOSITION

George S. Takemoto, Dedham, Mass., and Joseph A. Boudreau, Barrington, Ill., assignors to The Kendall Company, Boston, Mass.

Filed Jul. 7, 1983, Ser. No. 511,708

Int. Cl.³ C08K *5/52*

U.S. Cl. 524—127 **14 Claims**

1. A readily removable and repositionable pressure-sensitive adhesive composition in a suitable organic solvent, comprising:

(a) a carboxyl modified vinyl acetate-vinyl chloride copolymer, further comprising of from about 86 percent of vinyl chloride, about 13 percent vinyl acetate and about 1 percent of maleic acid;

(b) a polymeric polyester plasticizer; and

(c) a halo-organophosphorous plasticizer, being a chlorinated oligomeric phosphate ester.

11. A readily removable and repositionable pressure-sensitive adhesive composition in a suitable organic solvent, essentially comprising:

(a) a carboxyl modified vinyl acetate-vinyl chloride copolymer;

(b) an intermediate molecular weight polymeric polyester plasticizer having an average molecular weight of about 3,300;

(c) a chlorinated organophosphorous plasticizer.

4,487,873

AQUEOUS EMULSIONS OF HIGH SOFTENING POINT HYDROCARBON RESINS AND PROCESS FOR PREPARING THE SAME

Frank C. Jagisch, and Morris L. Evans, both of Baton Rouge, La., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Division of Ser. No. 339,647, Jan. 15, 1982, Pat. No. 4,414,346. This application Aug. 26, 1983, Ser. No. 526,627

Int. Cl.³ C08K *5/42*

U.S. Cl. 524—158 **3 Claims**

1. An aqueous emulsion of a hydrocarbon resin having a ring and ball softening point of at least 85° C. consisting essentially of from 3 to 10 parts by weight of an emulsifier blended with a mixture of from 0 to 10 parts by weight of resinplast and 80 to 97 parts by weight of said hydrocarbon resin, said admixture having a ring and ball

softening point ranging from 75° C. to 95° C. melt viscosity ranging from 20,000 to 60,000 centipoises.

4,487,874

POLYCARBONATE PROCESSING

Robert A. Lindner, Weehawken, N.J., assignor to Henkel Corporation, Minneapolis, Minn.

Filed Apr. 14, 1983, Ser. No. 484,790
Int. Cl.³ C08K 5/11; C08L 69/00
U.S. Cl. 524—311 10 Claims

1. A process for the manufacture of a polycarbonate article including the steps of:

(a) obtaining a polycarbonate resin;

(b) mixing with the polycarbonate resin a sufficient lubricating amount of a complex ester of the structural formula:

$$[RCO_2CH_2]_3CCH_2O[CO(CH_2)_xCO_2CH_2C(CH_2O_2CR)_2CH_2O]_yCO(CH_2)_xCO_2CH_2C[CH_2O_2CR]_3$$

and,

(c) the polycarbonate article is thereafter formed from a mixture of (a) and (b),

wherein the above formula y has an average value of from 3 through 12; x has a value of 2 to 6 and R is an aliphatic hydrocarbon group of from 5 to 9 carbon atoms.

4,487,875

ULTRA-HIGH MOLECULAR WEIGHT POLYETHYLENE COMPOSITION

Nobuhiro Nakajima, Tokyo, and Jyoji Ibata, Mishima, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 368,051, Apr. 13, 1982,. This application Feb. 17, 1984, Ser. No. 581,441
Claims priority, application Japan, Apr. 18, 1981, 56-58722; Apr. 24, 1981, 56-61442; Apr. 24, 1981, 56-61440; Oct. 2, 1981, 56-157336
Int. Cl.³ C08K 5/05
U.S. Cl. 524—385 15 Claims

1. A composition improved in extrudability comprising 100 parts by weight of an ultra-high molecular weight polyethylene having a viscometrically determined molecular weight of 1,000,000–6,000,000 and 10–50 parts by weight of at least one modifier selected from the group consisting of:

(A) saturated aliphatic alcohols having 15–30 carbon atoms, and

(B) petroleum hydrocarbon cyclopentadiene type resins having a molecular weight of 500–2,000 and a softening point of 70°–130° C.

4,487,876

WIRE COATING COMPOSITION

Richard J. Pokorny, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 517,768, Jul. 27, 1983, Pat. No. 4,455,348, which is a division of Ser. No. 283,292, Jul. 14, 1981, Pat. No. 4,414,355. This application Apr. 3, 1984, Ser. No. 596,251
Int. Cl.³ C08L 91/00
U.S. Cl. 524—390 11 Claims

1. A coating solution comprising an admixture of:

a. 35 to 70 weight percent of the solids of an anhydride copolymer which is the reaction product of:

(1) an alkyl or aryl substituted or unsubstituted unsaturated cyclic anhydride wherein each alkyl group contains up to 6 C atoms and the cyclic group contains 4 to 15 C atoms, and

(2) an unsaturated C_{10} to C_{24} aliphatic hydrocarbon;

b. 10 to 41 weight percent of the solids of a compatible, flexibilizing polymer which is selected from polyisobutylene and polymers of ethylene copolymerized with vinyl acetate, acrylate, esters, methacrylate esters, and alpha-olefins, and

c. 10 to 40 weight percent of the solids of a hydrophobic, compatible, fluoroaliphatic, radical-containing composition, said fluoroaliphatic radical being a monovalent, fluorinated, aliphatic radical having 5 to 14 carbon atoms which can be interrupted by divalent O atoms or trivalent N atoms bonded to C atoms; said fluoroaliphatic radical-containing composition being capable of providing water-repellancy to said admixture; and

d. up to 10 weight percent of the solids of a mercaptan compound, and

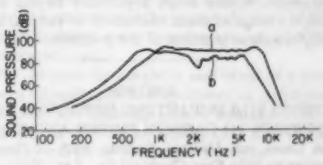
e. a solvent system comprising a mixture of at least one C_6 to C_9 aliphatic hydrocarbons, at least one lower molecular weight C_1 to C_4 alcohol, and trichlorotrifluoroethane.

4,487,877

DIAPHRAGM FOR LOUDSPEAKER

Takashi Takeda; Osamu Yamamoto, both of Osaka; Kousaku Murata, and Kazumasa Yamamoto, both of Hyogo, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sep. 30, 1982, Ser. No. 430,050
Claims priority, application Japan, Dec. 7, 1981, 56-197507; Dec. 7, 1981, 56-197508
Int. Cl.³ C08G 51/04
U.S. Cl. 524—413 2 Claims



1. A diaphragm for a loudspeaker comprising a composite film consisting essentially of a polybisphenol phthalate resin formed from the group consisting of isophthalic acid, terephthalic acid and mixtures thereof and a bisphenol A and a reinforcing material consisting essentially of talc.

4,487,878

COATING COMPOSITION OF A SOLUTION FLUOROCARBON POLYMER, A DISPERSED FLUOROCARBON POLYMER AND A POLYAMINE CURING AGENT

Joseph A. Vasta, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 509,706, Jun. 30, 1983, abandoned. This application Mar. 21, 1984, Ser. No. 591,969
Int. Cl.³ C07C 102/6, 103/10, 103/87; C08K 3/10
U.S. Cl. 524—413 29 Claims

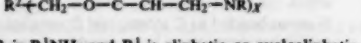
1. A coating composition comprising about 10–70% by weight binder and 30–90% by weight of a non-aqueous organic liquid; wherein the binder comprises:

a fluorocarbon polymer in solution comprising vinylidene fluoride and hexafluoropropylene having a weight average molecular weight of about 5,000–600,000;

dispersed fluorocarbon polymer particles having a particle size of about 1–150 microns and being selected from the group consisting of polytetrafluoroethylene, fluorinated ethylene/propylene polymer, polyvinyl fluoride, polyvinylidene fluoride, copolymer of tetrafluoroethylene/perfluoroalkoxyvinylether;

a metallic oxide which is an acid acceptor; and

a curing agent of the formula



where R is R^1NH_2 and R^1 is aliphatic or cycloaliphatic hydrocarbon radical, R^2 is C or a hydrocarbon group, R^3 is H or CH_3, X is 3 when R^2 is a hydrocarbon group and X is 4 when R^2 is C.

4,487,879

FILLED ARYLENE SULFIDE POLYMER COMPOSITIONS CONTAINING (A) GLASS FILTER IN COMBINATION WITH (B) A MINERAL FILLER

Donald G. Needham, Ramona, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 20, 1982, Ser. No. 420,437
Int. Cl.³ C08K *3/40, 3/34, 3/26, 3/30*
U.S. Cl. 524—423 **10 Claims**

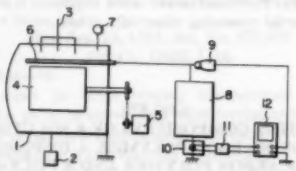
1. A filled arylene sulfide composition comprising
(a) at least 30 weight percent of the total composition of arylene sulfide polymer,
(b) up to about 65 weight percent of the total composition of fillers comprising glass filler and at least one mineral filler and
(c) a property modifying amount of up to about 12 weight percent of the total composition of a solid, resinous butadiene/styrene block copolymer having a vinyl content in a range of about 10 to about 14 percent based on the polybutadiene segment of the polymer.

4,487,880

METHOD FOR IMPARTING IMPROVED SURFACE PROPERTIES TO CARBON FIBERS AND COMPOSITE

Susumu Ueno, and Hideaki Kamata, both of Ibaraki, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Oct. 20, 1983, Ser. No. 543,891
Claims priority, application Japan, Oct. 27, 1982, 57-188526
Int. Cl.³ B05D *3/06*
U.S. Cl. 524—495 **7 Claims**



1. A method for imparting improved surface properties to a carbon fiber which comprises subjecting the surface of the carbon fiber to exposure to the atmosphere of low temperature plasma of an inorganic gas under a reduced pressure generated by glow discharge with application of an electric voltage between a grounded electrode and a power electrode, the discharge voltage between the electrodes being at least 4000 volts.

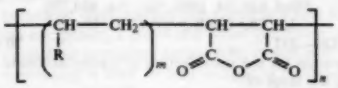
4,487,881

IMPACT IMPROVEMENT OF REINFORCED POLYCARBONATE/ABS BLENDS

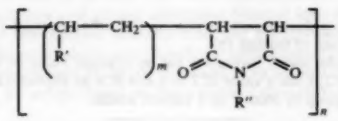
Herbert L. Rawlings, New Martinsville, W. Va., and Gerard E. Reinert, McMurray, Pa., assignors to Mobay Chemical Corporation, Pittsburgh, Pa.

Filed Oct. 3, 1983, Ser. No. 538,301
Int. Cl.³ C08L *69/00;* **C08K** *3/40*
U.S. Cl. 524—504 **13 Claims**

1. A thermoplastic molding composition comprising a blend of (a) an aromatic polycarbonate, (b) a graft elastomer which is characterized in having a rubber core substantially of polybutadiene and a graft phase which comprises styrene and acrylonitrile and in that its butadiene content is at least 5% relative to the weight of said graft elastomer, (c) a polyanhydride resin selected from the group consisting of (i) a linear copolymer of maleic acid anhydride and an α-olefin of the general formula



wherein R is a C_{10}–C_{28} alkyl radical, n is from 1 to 200, and m is 1 to 3, and (ii) a linear copolymer of an imidized derivative of maleic acid anhydride and an α-olefin of the general formula



wherein R′ is a phenyl or a substituted phenyl radical or a C_6–C_{28} alkyl, R″ is an aryl radical having 6 to 12 carbon atoms or an aliphatic radical having 1 to 30 carbon atoms, n is from 1 to 200 and m is 1 to 3 and (d) glass fibers.

4,487,882

FLUOROELASTOMER COMPOSITION

Yutaka Ueta, Osaka; Shoji Kawachi, Hyogo, and Kazutaka Hosokawa, Osaka, all of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Filed Sep. 28, 1983, Ser. No. 536,532
Claims priority, application Japan, Sep. 28, 1982, 57-170595
Int. Cl.³ C08L *27/16, 53/00, 27/18, 27/20*
U.S. Cl. 524—505 **19 Claims**

1. A fluoroelastomer composition, comprising:
a fluoroelastomer selected from the group consisting of vinylidene fluoride/hexafluoropropylene copolymers, vinylidene fluoride/tetrafluoroethylene/hexafluoropropylene terpolymers, vinylidene fluoride/chlorotrifluoroethylene copolymers, tetrafluoroethylene/propylene copolymers, hexafluoropropylene/ethylene copolymers, perfluoroalkyl vinyl ether/olefin copolymers, fluorosilicone elastomers and fluorophosphazene elastomers; and
a thermoplastic fluoroelastomer comprising a polymeric chain having two or three polymer segments, at least one iodine atom liberated from an iodinated compound bonded to a terminal position of the polymeric chain and a fragment of the iodinated compound from which at least one iodine atom has been removed therefrom bonded at another terminal position of said polymeric chain, said iodinated compound being a perhalohydrocarbon of 1 to 16 carbon atoms wherein at least one of the halogen atoms is an iodine atom but no more than one iodine atom is present on every two adjacent carbon atoms; one polymer segment (when the polymeric chain comprises two polymer segments) or one or two polymer segments (when the polymeric chain comprises three polymer segments) being an elastomeric polymer segment(s) having a molecular weight of from 30,000 to 1,200,000 selected from the group consisting of (1) a vinylidene fluoride/hexafluoropropylene or pentafluoropropylene/tetrafluoroethylene polymer in a molar ratio of 45–90:5–50:0–35 and (2) a perfluoro(C_1-C_3-alkyl vinyl ether) (including those having plural ether linkages)/tetrafluoroethylene/vinylidene fluoride polymer in a molar ratio of 15–75:0–85:0–85, the other polymer segment(s) being a non-elastomeric poly-

mer segment having a molecular weight of from 3,000 to 400,000 selected from the group consisting of (3) a vinylidene fluoride/tetrafluoroethylene polymer in a molar ratio of 0:100 to 100:0 and (4) a ethylene/tetrafluoroethylene/hexafluoropropylene, 3,3,3-trifluoropropylene-1, 2-trifluoromethyl-3,3,3-trifluoropropylene-1 or perfluoro(C_1-C_3-alkyl vinyl ether) (including those having plural ether linkages) polymer in a molar ratio of 40–60:60:40:0–30, wherein the weight ratio of the elastomeric polymer segment to the nonelastomeric polymer segment is from 40:60 to 95:5.

4,487,883

ONE-PART MOISTURE CURED AMINOSILOXANES

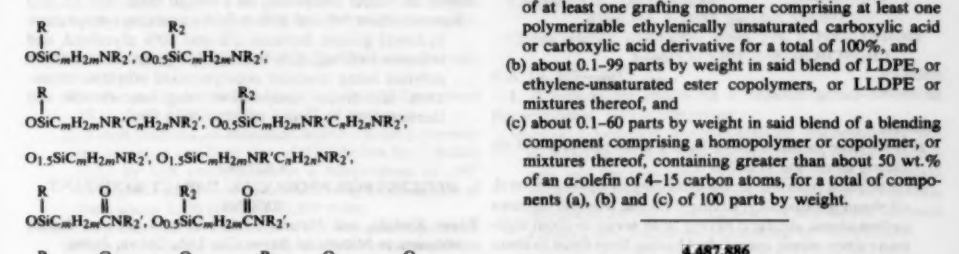
Gary R. Homan, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 453,638, Dec. 27, 1982, abandoned. This application Sep. 22, 1983, Ser. No. 534,845

Int. Cl.³ C08K *5/02*

U.S. Cl. 524—792 **13 Claims**

1. A composition, stable in the absence of moisture, consisting essentially of (A) a siloxane polymer having at least one unit containing a nitrogen-hydrogen bond selected from the group consisting of



and mixtures thereof wherein R is selected from the group consisting of monovalent hydrocarbon radicals, substituted monovalent hydrocarbon radicals, and a radical having the general formula —OX wherein X is selected from the group consisting of monovalent hydrocarbon radicals and substituted monovalent hydrocarbon radicals; R′ is selected from the group consisting of hydrogen, monovalent hydrocarbon radicals, and substituted monovalent hydrocarbon radicals; wherein at least one R′ per siloxy unit is hydrogen; and m and n have values of 1 to 4 and the other units of the siloxane polymer are selected from the group consisting of $RSiO_{3/2}$, R_2SiO, and $R_3SiO_{\frac{1}{2}}$ wherein R is as defined above, and (B) a readily hydrolyzable, anhydrous additive selected from the group consisting of titanates, zirconates, vanadates, germanates and mixtures thereof.

4,487,884

AQUEOUS SOLUTION OF CATIONIC THERMOSETTING RESIN FROM N-BIS(AMINOPROPYL)METHYLAMINE/OXALIC ACID

William W. Maslanka, London-Britain Township, Chester County, Pa., assignor to Hercules Incorporated, Wilmington, Del.

Filed Apr. 27, 1983, Ser. No. 488,893

Int. Cl.³ C08L *77/06*

U.S. Cl. 524—845 **5 Claims**

1. An aqueous solution of a water-soluble, cationic thermosetting resin derived by reacting N-bis(aminopropyl)-methylamine with a saturated dicarboxylic acid component comprising oxalic acid to form a polyaminopolyamide containing tertiary amine groups, the mole ratio of N-bis(aminopropyl)-methylamine to the acid component being from about 0.9:1 to about 1.2:1 and then reacting the polyaminopolyamide, in aqueous solution with from about 1 mole to about 1.5 moles of epihalohydrin per mole of tertiary amine groups present in said polyaminopolyamide.

4,487,885

ADHESIVE BLENDS

Ashok M. Adur, Elk Grove Village; Seymour Schmukler, Palatine; John Machonis, Jr., Schaumburg, and Mitsuzo Shida, Barrington, all of Ill., assignors to Chemplex Company, Rolling Meadows, Ill.

Continuation-in-part of Ser. No. 339,984, Jan. 18, 1982, abandoned. This application Jul. 1, 1983, Ser. No. 510,292

Int. Cl.³ C08L *51/06*

U.S. Cl. 525—74 **12 Claims**

1. An adhesive blend particularly for adhering to a wide variety of polar substrates and consisting essentially of:

(a) about 0.1 to less than about 40 parts by weight in said blend of a graft copolymer of about 70–99.95 wt.% of a polyethylene backbone grafted with about 30–0.05 wt.% of at least one grafting monomer comprising at least one polymerizable ethylenically unsaturated carboxylic acid or carboxylic acid derivative for a total of 100%, and

(b) about 0.1–99 parts by weight in said blend of LDPE, or ethylene-unsaturated ester copolymers, or LLDPE or mixtures thereof, and

(c) about 0.1–60 parts by weight in said blend of a blending component comprising a homopolymer or copolymer, or mixtures thereof, containing greater than about 50 wt.% of an α-olefin of 4–15 carbon atoms, for a total of components (a), (b) and (c) of 100 parts by weight.

4,487,886

PROCESS FOR THE PRODUCTION OF AN OBJECT FROM AN ABS-POLYMER COMPOSITION

Leslie G. W. Dunning, Heythuysen, and Jean P. L. M. N. de Warrimont, Geulle, both of Netherlands, assignors to Stamicarbon B.V., Licensing Subsidiary of DSM, Geleen, Netherlands

Continuation-in-part of Ser. No. 397,872, Jul. 13, 1982, abandoned, which is a continuation of Ser. No. 302,084, Sep. 14, 1981, abandoned. This application Oct. 24, 1983, Ser. No. 544,730

Claims priority, application Netherlands, Sep. 16, 1980, 8005166

Int. Cl.³ C08L *51/04, 55/02*

U.S. Cl. 525—86 **4 Claims**

1. A process for the production of a molded or extruded object from a combined granular composition containing ABS polymer, said composition comprising a mixture of

I from 10 to 98 parts by weight of at least one granular graft copolymer II obtained by polymerizing a mixture of one or more unsaturated nitriles and one or more vinylaromatic compounds in the presence of a rubber selected from the group consisting of polybutadiene, butadiene-styrene rubber, butadiene-acrylonitrile rubber, acrylate rubber, ethylene-propylene or ethylene-propylene-diene rubber, ethylene-vinylacetate, and chloroprene rubber,

II from 2 to 90 parts by weight of a granular copolymer II of at least one unsaturated nitrile and one or more vinylaromatic compounds, and

III from 0 to 20 parts by weight of at least one granular additive selected from the group consisting of antioxidants, UV-stabilizers, lubricants, fillers, antistatics, flame retardants, and foaming agents,

wherein the ratio of the average particle size by weight of the granular copolymer II to the average particle size by weight of the granular graft copolymer I exceeds 1.5, and wherein the

polymer composition is melted, homogenized and extruded or injection molded into an object.

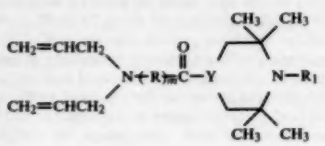
4,487,887

DIALLYL AMINO-4-(2,2,6,6-TETRAMETHYL PIPERIDYL) CARBOXYLIC ACID ESTERS AND AMIDES AS MONOMERS AND POLYMERS AND STABILIZED SYNTHETIC RESIN COMPOSITIONS

Yutaka Nakahara, Iwatsuki, and Ryoji Kimura, Urawa, both of Japan, assignors to Adeka Argus Chemical Co., Ltd., Urawa, Japan

Filed Sep. 9, 1983, Ser. No. 531,148
Claims priority, application Japan, Sep. 13, 1982, 57-159198
Int. Cl.³ C08L 39/04
U.S. Cl. 525—123 **39 Claims**

1. Diallyl amino-4-(2,2,6,6-tetramethyl piperidyl)carboxylic acid esters and amides having the formula:



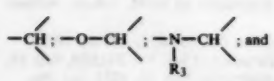
I

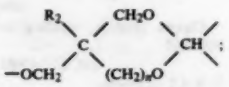
wherein:

R is alkylene or alkyleneoxy having from one to about six carbon atoms and m is 0 or 1;

R_1 is selected from the group consisting of hydrogen; oxyl; alkyl and hydroxyalkyl having from one to about eighteen carbon atoms; alkylaryl having from seven to about eighteen carbon atoms; epoxy alkyl having from three to about eighteen carbon atoms; and acyl having from two to about eighteen carbon atoms; and

Y is selected from the group consisting of

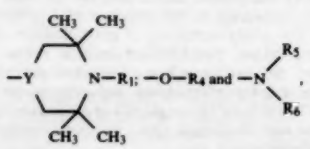




where

R_2 and R_3 are hydrogen or alkyl having from one to about eight carbon atoms and n is 0 or 1;

Z is selected from the group consisting of



in which

R_4, R_5 and R_6 are selected from the group consisting of hydrogen; alkyl having from one to about eighteen carbon atoms; cycloalkyl having from three to about twelve carbon atoms; and aryl having from six to about thirty carbon atoms.

4,487,888

PHENOLIC MODIFIED URETHANE ELASTOMER

Aubert Y. Coran, and Raman Patel, both of Akron, Ohio, assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 361,282, Mar. 24, 1982,. This application Jul. 21, 1983, Ser. No. 515,741
Int. Cl.³ C08F 8/00; C08G 69/48; C08L 77/00, 75/00
U.S. Cl. 525—132 **6 Claims**

1. An improved polymer blend comprising a blend of (a) about 1–99 parts by weight of urethane elastomer having methylol phenolic groups grafted thereto by links of the type formed by the reaction of urethane elastomer and methylol phenolic material in the presence of acidic activator and (b) correspondingly, about 99–1 parts by weight of a polyamide having an affinity for methylol phenolic groups.

4,487,889

AQUEOUS GLYCOLURIL THERMOSETTING COATING

Gary P. Craun, Wickliffe, Ohio, assignor to SCM Corporation, New York, N.Y.

Filed Apr. 25, 1984, Ser. No. 603,693
Int. Cl.³ C08L 61/24
U.S. Cl. 525—163 **6 Claims**

1. A surface coating composition containing a polymeric binder, the binder comprising on a weight basis:

between about 5% and 60% polyol containing two or more hydroxyl groups, between 2% and 60% glycoluril, and between 10% and 80% emulsion polymer, said emulsion polymer being emulsion copolymerized ethylenic monomers, said binder composition being heat curable and thermosetting to form a cured coating film.

4,487,890

PROCESS FOR PRODUCING IMPACT RESISTANT RESINS

Kazuo Kishida, and Hiroshi Mohri, both of Ohtake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Oct. 8, 1982, Ser. No. 433,507
Claims priority, application Japan, Oct. 9, 1981, 56-161233; Oct. 12, 1981, 56-162376
Int. Cl.³ C08F 8/00
U.S. Cl. 525—193 **16 Claims**

1. A process for producing an impact resistant graft polymer which comprises:

(a) forming an acid residue-containing copolymer (B) latex from a monomer group (b) consisting of at least one, α, β-unsaturated carboxylic acid selected from the group of acrylic acid, methacrylic acid, itaconic acid and crotonic acid; at least one alkyl acrylate having a C_1–C_{12} alkyl group and one or more copolymerizable monomers; by first, emulsion polymerizing a 5 to 90% by wt. portion of said monomer group (b) consisting of a monomer selected from the group of at least one alkyl acrylate having a C_1–C_{12} alkyl group, and at least one alkyl acrylate having a C_1–C_{12} alkyl group with one or more copolymerizable monomers which do not include the α, β-unsaturated carboxylic acid monomers; and then consecutively emulsion polymerizing the residual 95 to 10% by wt. portion of the monomer group (b) consisting of at least one of the α, β-unsaturated carboxylic acids selected from the group consisting of acrylic acid, methacrylic acid, itaconic acid and crotonic acid, at least one of the alkyl acrylates selected from the group of C_1–C_{12} alkyl acrylates, and one or more of the copolymerizable monomers such that the formed copolymer (b) latex consists of 3 to 30% by wt. of said, α, β-unsaturated carboxylic acid monomer component, 97 to 35% by wt. of the alkyl acrylate monomer or monomers component, and 0 to 48% by wt. of the one or more of the copolymerizable monomer components;

(b) adding 0.1 to 5 parts by weight of said copolymer (B) latex to 100 parts by weight of synthetic rubber (A) latex which has been adjusted to pH 7 or higher to obtain an

agglomerated rubber (C) latex, wherein a larger portion is an elastomer constituting the synthetic rubber (A) and a smaller portion is the copolymer (B) latex incorporated therein, and wherein said agglomerated rubber (C) latex has a particle diameter of at least 0.2 microns; and then

(c) emulsion polymerizing 93 to 30 parts by weight of grafting monomer (d) consisting of 30% by wt. or more of at least one monomer selected from the group consisting of styrene, acrylonitrile and methylmethacrylate and 70% by wt. or less of a monomer selected from the group consisting of styrene, α-methylstyrene, vinyltoluene, acrylonitrile, methacrylonitrile, alkyl methacrylates having a C_1–C_{12} alkyl group and alkyl acrylates having a C_1–C_{12} alkyl group copolymerizable therewith in the presence of 7 to 70 parts by weight of said agglomerated rubber (C) latex.

4,487,891

THERMOPLASTIC POLYMER BLEND COMPOSITION AND MEMBRANE FORMED THEREFROM

Kim L. Walton, Baton Rouge, La., and Paul A. Pezzoli, Gahanna, Ohio, assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 6, 1984, Ser. No. 577,640
Int. Cl.³ C08L *23/28, 31/04, 23/08*
U.S. Cl. 525—222 **11 Claims**

1. A polymer blend composition, the composition comprising:

(A) a thermoplastic chlorinated polyethylene resin, the resin having

(1) a chemically combined chlorine content of from about 24 to about 45 percent by weight of resin and

(2) a melt viscosity, as measured with a capillary rheometer having a capillary size of 0.05 inches by 2 inches (0.13 by 5.08 centimeters) at a temperature of 190° Centigrade and a shear rate of 150 reciprocal seconds of from about 7,000 to about 25,000 poise;

(B) a first elastomeric copolymer of ethylene, the copolymer having polymerized therein ethylene in an amount of from about 40 to about 62 percent by weight of polymer and vinyl acetate in an amount of from about 38 to about 60 percent by weight of polymer, the copolymer also having

(1) a melt index, as measured in accordance with American Society for Testing and Materials Test D-1238, of from about 0.1 to about 100 grams per 10 minutes and

(2) a density, as measured in accordance with American Society for Testing and Materials Test D-792, of from about 0.96 to about 0.98 grams per cubic centimeter; and

(c) a second elastomeric copolymer of ethylene, the copolymer having polymerized therein ethylene in an amount of from about 73 to about 87 percent by weight of polymer and vinyl acetate in an amount of from about 13 to about 27 percent by weight of polymer, the copolymer also having

(1) a melt index, as measured in accordance with American Society for Testing and Materials Test D-1238, of from about 0.1 to about 500 grams per 10 minutes, and

(2) a density, as measured in accordance with American Society for Testing and Materials Test D-792, of from about 0.93 to about 0.95 grams per cubic centimeter.

4,487,892

RUBBER COMPOSITIONS FOR USE IN TIRES

Toshio Ohmori, Yokkaichi, and Mineo Yamamoto, Suzuka, both of Japan, assignors to Bridgestone Tire Co., Ltd. and Japan Synthetic Rubber Co., Ltd., both of Tokyo, Japan

Filed Mar. 30, 1983, Ser. No. 480,617
Claims priority, application Japan, Mar. 30, 1982, 57-49998
Int. Cl.³ C08L *7/00, 9/00, 9/06, 13/02*
U.S. Cl. 525—237 **3 Claims**

1. A rubber composition for use in tires comprising:

(A) 1 to 30% by weight of at least one non-crystallizable resinous polymer having a glass transition temperature of not less than 110° C. selected from the group consisting of α-methylstyrene homopolymer, α-methylstyrene-styrene copolymer, nuclear-substituted styrene homopolymer, nuclear-substituted α-methylstyrene homopolymer, styrene-nuclear-substituted styrene copolymer, styrene-nuclear-substituted α-methylstyrene copolymer and copolymers thereof containing a diene monomer; and

(B) 70 to 99% by weight of at least one rubber selected from the group consisting of styrene-butadiene copolymer rubber containing not more than 60% by weight of bound styrene produced by emulsion polymerization or solution polymerization using an organic alkali metal catalyst, natural rubber, polybutadiene rubber having a 1,4-configuration of not less than 80%, polybutadiene rubber having a 1,2-configuration of not less than 50%, halogenated butyl rubber, butyl rubber and polyisoprene rubber having a cis-1,4-configuration of not less than 90%.

4,487,893

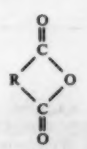
PROCESS FOR PRODUCING CARBOXYL GROUP-CONTAINING FLUOROPOLYMER

Masaaki Yamabe; Gen Kojima, both of Machida, and Katsuyuki Akiyama, Yotsukaidoh, all of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

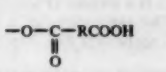
Filed Jan. 6, 1983, Ser. No. 456,097
Claims priority, application Japan, Feb. 5, 1982, 57-16368
Int. Cl.³ C08F *8/00*
U.S. Cl. 525—386 **9 Claims**

1. A process for producing a carboxyl group-containing fluoropolymer, which comprises:

reacting a hydroxyl group-containing fluoropolymer obtained by reacting at least one fluoroolefin with a comonomer, said fluoropolymer containing 1/50 to 1 hydroxyl groups to the number of fluoroolefin units, in an aromatic compound having a boiling point of at least 100° C. with a dibasic acid anhydride represented by the formula:



wherein R represents a bifunctional organic group, to convert at least a portion of the hydroxyl groups into ester groups represented by the formula:



wherein R is as defined above.

4,487,894

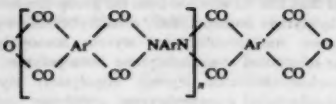
POLYIMIDE-EPOXY THERMOSET RESINS

Chung J. Lee, Sheboygan, Wis., assignor to Plastics Engineering Company, Sheboygan, Wis.

Filed Sep. 20, 1982, Ser. No. 420,568
The portion of the term of this patent subsequent to Oct. 18, 2000, has been disclaimed.
Int. Cl.³ C08G *283/04*
U.S. Cl. 525—423 **20 Claims**

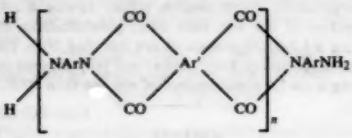
1. In a process of reacting a polyepoxide composition with a polyimide composition having terminal anhydride or amine groups, the improvement comprising:

(a) first reacting said polyepoxide compositions with a solution of a polyimide dianhydride of the formula:



at a temperature in the range of room temperature to about 120° C.; and

(b) subsequently reacting the reaction product of (a) with a solution of a polyamide diamine of the formula:



at a temperature in the range of 60° C. to 120° C.; in which formulas:

Ar′ is a tetravalent aromatic radical, the four carbonyl groups being attached directly to separate carbon atoms and each pair of carbonyl groups being attached to adjacent carbon atoms in the Ar′ radical except that where the Ar′ is a naphthalene radical, one or both pairs of the carbonyl groups being attached directly to separate carbon atoms and each pair of carbonyl groups being attached to adjacent carbon atoms in the Ar′ radical except that where the Ar′ is a naphthalene radical, one or both pairs of the carbonyl groups may be attached to peri carbon atoms;

Ar is a divalent aromatic radical; and

n is an integer having a value of at least one.

4,487,895

POWDERED MIXTURE OF POLYAMIDES FOR HEAT SEALING BY THE POWDER POINT PROCESS

Rainer Feldmann, Marl, and Heinz Scholten, Haltern, both of Fed. Rep. of Germany, assignors to Chemische Werke Hüls AG, Marl, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 388,427, Jun. 14, 1982, abandoned, which is a division of Ser. No. 145,377, Apr. 30, 1980, abandoned. This application Jun. 1, 1984, Ser. No. 615,687

Claims priority, application Fed. Rep. of Germany, May 19, 1979, 2920416

Int. Cl.[3] **C08L** *77/02*; **B32B** *27/34*; **D04H** *27/36*

U.S. Cl. 525—432 **7 Claims**

1. Powdered polyamide homogeneous mixtures for use in the heat sealing of textiles by the powder point process, consisting esstentially of:

(a) about 95 to 40% by weight of at least a first copolyamide with a melting point of at least about 110° to 140° C. and having a proportion of a basic laurylactam monomer component of at least 20% and at most 70% by weight; and

(b) about 5 to 60% by weight of at least a second copolyamide with a melting point between about 80° to 110° C. and having a proportion of a basic laurylactam monomer component or laurylactam and 11-aminoundecanoic acid copolymer of at least 25% and at most 70% by weight, where the percentages are based upon the total weight of the copolyamide mixtures.

4,487,896

COPOLYESTER-CARBONATE COMPOSITIONS EXHIBITING IMPROVED PROCESSABILITY

Victor Mark, Evansville, and Charles V. Hedges, Mt. Vernon, both of Ind., assignors to General Electric Company, Mt. Vernon, Ind.

Filed Sep. 2, 1983, Ser. No. 528,932

Int. Cl.[3] **C08G** *63/64*

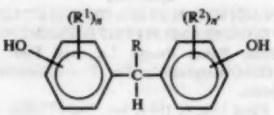
U.S. Cl. 525—439 **22 Claims**

1. Copolyester-carbonate resin composition exhibiting improved processability comprised of (i) at least one copolyester-carbonate resin prepared by reacting

(a) a carbonate precursor;

(b) at least one difunctional carboxylic acid or a reactive derivative thereof; and

(c) at least one dihydric phenol represented by the general formula



wherein:

R is selected from straight chain alkyl radicals containing from 1 to 5 carbon atoms,

R^1 is independently selected from the group consisting of aryl radicals, alkaryl radicals, halogen radicals, and monovalent hydrocarbonoxy radicals,

R^2 is independently selected from the group consisting of aryl radicals, alkaryl radicals, halogen radicals, and monovalent hydrocarbonoxy radicals, and

n and n′ are independently selected from positive integers having a value of from 0 to 4 inclusive.

4,487,897

PROCESS FOR RADICAL POLYMERIZING ACRYLIC MONOMERS

Naoki Matsuoka; Hiroshi Matsumoto; Yutaka Hori; Yoshio Miki; Kenji Sano, and Ichiro Ijichi, all of Osaka, Japan, assignors to Nitto Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 18, 1983, Ser. No. 467,634

Int. Cl.[3] **C08F** *2/02*

U.S. Cl. 526—64 **11 Claims**

1. A process for radical polymerizing acrylic monomers, comprising the steps of:

providing a reactor having a temperature control means thereon;

continuously charging the reactor with a supply of acrylic monomers having a viscosity of 10 poises or less at ordinary temperatures wherein the acrylic monomers comprise at least 50% by weight of alkyl esters of acrylic acids;

continuously conveying the supply of acrylic monomer through a conveyance course of the reactor thereby causing the supply to continuously contact renewed surfaces of the reactor wherein the viscosity gradient in the reactor is not less than 100/min;

controlling the temperature of the supply in the reactor such that the viscosity of the supply in the reactor can be increased by rapid polymerization of the acrylic monomers in the first half of the reactor to at least 100 poises and the polymerization thereof can proceed up to a prescribed rate of conversion in a secondary area of the reactor wherein the temperature in the first half of the reactor is 40° to 120° C. and the temperature in the secondary area of the reactor is 60° to 150° C.; and

continuously recovering polymerized product from the reactor.

4,487,898

PROCESS OF CONTINUOUS SUSPENSION POLYMERIZATION

Shinji Kato; Kyouji Uku, and Hisashi Morikawa, all of Takasago, Japan, assignors to Kanegafuchi Chemical Industry Co., Ltd., Osaka, Japan

Filed Jun. 4, 1982, Ser. No. 384,936
Claims priority, application Japan, Jun. 12, 1981, 56-91314; Nov. 27, 1981, 56-191380
Int. Cl.³ C08F 2/18
U.S. Cl. 526—65 4 Claims

1. A continuous suspension polymerization process for producing polymeric particles of substantially uniform particle size, which comprises the steps of

(1) jetting a monomeric liquid through an orifice under vibration into a first vertical reactor charged with aqueous medium to make monomeric droplets dispersed in aqueous medium, the specific gravity of the monomeric droplets being smaller than that of the aqueous medium,

(2) letting the resulting dispersion flow downwardly in the first reactor at a superficial velocity of not more than 1 cm/sec to make a fluidized bed and carrying out the polymerization of the monomeric droplets in the fluidized bed until the polymerizing droplets attain a specific gravity nearly equal to that of the aqueous medium, so that destruction or agglomeration of the polymerizing droplets no longer takes place,

(3) sending the resultant polymerizing droplets from the bottom of the first reactor to the lower part of a second vertical reactor wherein further polymerization proceeds in the polymerizing droplets as they flow upward through the second reactor,

(4) returning the resulting droplets from the upper part of the second reactor through a pump to the upper part of the first reactor, the circulation of droplets among the first and second reactors being carried out until the polymerizing droplets attain a specific gravity larger than that of the aqueous medium, and

(5) letting the resulting polymerized droplets having a specific gravity larger than the aqueous medium flow from the bottom of the second reactor.

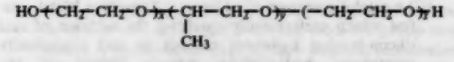
4,487,899

REDUCED POLYMER BUILDUP IN CONDENSER OF REACTOR VESSEL

Donald E. White, Brecksville, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 249,768, Apr. 1, 1981, abandoned. This application Sep. 22, 1982, Ser. No. 421,626
Int. Cl.³ C08F 2/16
U.S. Cl. 526—74 1 Claim

1. In a process for the suspension polymerization of vinyl chloride monomer in an aqueous medium in the presence of a dispersing agent(s) and a monomer-soluble polymerization initiator with agitation and primary cooling in a polymerization vessel, the improvement comprising mounting a reflux condenser on said polymerization vessel, said condenser being open to the vessel throughout the entire polymeriztion reaction, polymerizing said vinyl chloride monomer by maintaining the reaction mixture at a temperature in the range of about 40° C. to about 80° C., and adding into the reaction mixture at a constant rate during the course of the polymerization reaction from about 0.003% to about 0.5% by weight, based on the weight of said vinyl chloride monomer, of a nonionic surface active agent having an HLB in the range of about 9 to about 16 and selected from the group consisting of polyoxyethylene alkylphenols, polyoxyethylene alcohols, and polyalkylene oxide block copolymers having the general formula



wherein the sum x and z is an integer from 3 to 73 and y is an integer from 20 to 56, wherein the addition of said surface active agent is started when conversion of monomer to polymer is in the range of about 5% to about 20%, whereby splashing of the reaction mixture and polymer buildup in said condenser are substantially eliminated.

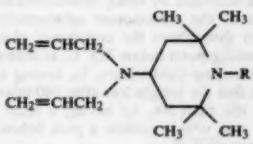
4,487,900

DIALLYL 4-(2,2,6,6-TETRAMETHYL PIPERIDYL) AMINES AS MONOMERS AND POLYMERS AND STABILIZED SYNTHETIC RESIN COMPOSITIONS

Yutaka Nakahara, Iwatsuki, and Ryoji Kimura, Urawa, both of Japan, assignors to Adeka Argus Chemical Co., Ltd., Urawa, Japan

Filed Sep. 9, 1983, Ser. No. 531,149
Claims priority, application Japan, Sep. 13, 1982, 57-159198
Int. Cl.³ C08L 39/04
U.S. Cl. 525—123 21 Claims

1. Diallyl 4-(2,2,6,6-tetramethyl piperidyl)amines having the formula:



I

wherein:

R is selected from the group consisting of hydrogen, oxyl, alkyl and hydroxyalkyl having from one to about eighteen carbon atoms; alkylaryl having from seven to about eighteen carbon atoms; epoxy alkyl having from three to about eighteen carbon atoms and acyl having from two to about eighteen carbon atoms.

4,487,901

POLYMERIZATION OF BETA-PINENE

Gerald D. Malpass, Jr., New Castle, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Apr. 4, 1984, Ser. No. 596,487
Int. Cl.³ C08F 4/52
U.S. Cl. 526—185 6 Claims

1. A process for preparing an essentially water-white, hard beta-pinene resin comprising

(a) hydrolyzing and activating a catalytic amount of organoaluminum compound of the formula AlR_3, wherein R is hydrogen, oxyhydrocarbon or hydrocarbon radicals or mixtures thereof, in an inert solvent by the addition of about 0.5 mole to about 1.0 mole of water per mole of the organoaluminum compound in the solvent;

(b) adding a beta-pinene monomer to the hydrolyzed and activated organoaluminum compound in the solvent;

(c) adding an alkyl halide of the general formula R′X, whereinR′ is H or hydrocarbon radical and X is a halide radical at a temperature from about 20° C. to about 70° C. over a period of time sufficient to complete the addition of the alkyl halide and to form a reaction mixture containing the polymerized beta-pinene;

(d) quenching the reaction mixture with water so that the mixture separates into at least an aqueous phase and an organic phase;

(e) water-washing the reaction mixture;

(f) recovering the organic phase; and ,

(g) recovering the resin by distilling off the solvent.

4,487,902

POLYMER OF TFE AND F-ALKYL ETHYLENE

Scott J. Fritschel, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 289,493, Aug. 6, 1981, abandoned, which is a continuation-in-part of Ser. No. 190,562, Sep. 25, 1980, abandoned. This application Jun. 23, 1983, Ser. No. 507,082

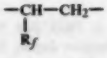
Int. Cl.[3] C08F *14/26, 14/18*

U.S. Cl. 526—253 2 Claims

1. A substantially pure copolymer consisting of:

93–99 mol % tetrafluoroethylene units, and complementally,

7–1 mol % fluorinated alkyl ethylene comonomer units of the formula



wherein R_f is perfluorinated alkyl of 2–10 carbon atoms or substituted perfluorinated alkyl of 2–10 carbon atoms in which the perfluorinated alkyl can be substituted with up to three hydrogen atoms,

said copolymer characterized by being semi-crystalline, by having the units of the comonomer substantially uniformly positioned throughout the copolymer chain, by having a sharp melting point below 315° C. as determined by Differential Scanning Calorimetry, by having a thermal stability such that the weight loss after 140 minutes at 350° C. in air is less than 5%, by having a small angle X-ray scattering scan which exhibits a peak below 1° 2, and by being nonelastomeric.

4,487,903

FLUORINE-CONTAINING ELASTOMERIC COPOLYMERS, AND THEIR PRODUCTION

Masayoshi Tatemoto, and Toshihiko Amano, both of Osaka, Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Filed Sep. 29, 1982, Ser. No. 427,559

Claims priority, application Japan, Oct. 22, 1981, 56-169748

Int. Cl.[3] C08F *114/18, 114/22, 114/24, 114/26*

U.S. Cl. 526—247 9 Claims

1. A fluorine-containing elastomeric copolymer consisting of units of at least one fluorovinyl ether of the formula:

$$XO(CFYCF_2O)_nCF=CF_2$$

wherein X is C_1–C_3 perfluoroalkyl, C_1–C_3 ω-hydroperfluoroalkyl or C_1–C_3 ω-chloroperfluoroalkyl, Y is hydrogen, chlorine, fluorine, trifluoromethyl, difluoromethyl or chlorodifluoromethyl and n is an integer of 1 to 4 and units of at least one other fluorine-containing monomer selected from the group consisting of tetrafluoroethylene, trifluoroethylene, chlorotrifluoroethylene, vinylidene fluoride and vinyl fluoride, the content of the fluorovinyl ether units being 15 to 50 mol%.

4,487,904

URETHANIZED ACRYLIC RESIN MATERIAL FOR PLASTIC LENS AND LENS COMPOSED THEREOF

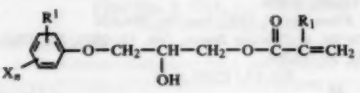
Tadanori Fukuda, Otsu, and Sadayuki Sakamoto, Shiga, both of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Sep. 21, 1983, Ser. No. 534,197

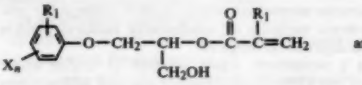
Int. Cl.[3] C08F *26/02, 126/02, 226/02*

U.S. Cl. 526—301 7 Claims

1. A resin material for a plastic lens, having a refractive index of at least 1.58 and comprising a homopolymer formed by polymerizing a urethanized acrylic or methacrylic monomer or a copolymer formed by copolymerizing a urethanized acrylic or methacrylic monomer with another vinyl monomer having an aromatic ring, said urethanized acrylic or methacrylic monomer being a product of a reaction of a hydroxyl group of an acrylic or methacrylic monomer having a nucleus-halogen-substituted aromatic ring with an isocyanate group of a polyfunctional isocyanate, said acrylic or methacrylic monomer having a nucleus-halogen-substituted aromatic ring and a hydroxyl group in the molecule being at least one member selected from the group consisting of compounds, represented by the following general formulae (I), (II) and (III):

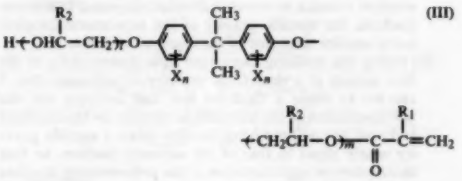


(I)



(II)

and



(III)

wherein X is chlorine, bromine or iodine, each of R_1 and R_2 is hydrogen or a methyl group, n is an integer of from 1 to 4, and l and m are integers of from 0 to 4, with the proviso that the sum of l and m is from 0 to 4, and the amount of the vinyl monomer having an aromatic ring to be copolymerized with the urethanized acrylic or methacrylic monomer being up to 70% by weight based on the total weight of the monomers.

4,487,905

WETTABLE SILICONE RESIN OPTICAL DEVICES AND CURABLE COMPOSITIONS THEREFOR

Darrell D. Mitchell, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Mar. 14, 1983, Ser. No. 475,270

Int. Cl.[3] C08G *77/06*

U.S. Cl. 528—15 20 Claims

1. A curable polysiloxane composition consisting essentially of

(A) 100 parts by weight of an acrylate-functional polysiloxane composition containing acrylate-functional siloxane units of the unit formula $H_2C=CROOR'SiO_{1.5}$ where R is a methyl radical or hydrogen and R' is a divalent alkylene radical of from 1 to 4 inclusive carbon atoms and containing siloxane units possessing aliphatically unsaturated hydrocarbon radicals selected from the group consisting of vinyl, allyl and butenylene radicals, the remaining silicon-bonded substituents in addition to divalent oxygen radicals present in said polysiloxane essentially being selected from the group consisting of alkyl radicals of from 1 to 3 inclusive carbon atoms and phenyl radicals,

(B) an amount of an organosilicon cross-linking agent containing an average of at least two silicon-bonded hydrogen radicals per molecule, said amount being no greater than that required to provide a 1:1 mole ratio of silicon-bonded hydrogen radicals to total moles of said aliphatically unsaturated hydrocarbon radicals present in (A), essentially any remaining substituents in addition to divalent oxygen radicals present in said agent being selected from the group consisting of alkyl radicals of from 1 to 3 inclusive carbon atoms and phenyl radicals, and

(C) a catalytic amount of a Group 8 Transition Metal catalyst which preferentially catalyzes the addition of said silicon-bonded hydrogen radicals to said aliphatically unsaturated hydrocarbon radicals instead of the >C=C< portion of the acrylate-functional siloxane

units, there being at least a sufficient amount of said aliphatically unsaturated hydrocarbon radicals in (A) such that when the mixture of (A), (B) and (C) is cured to form a resin, said resin possesses a flexural strength value of at least 3,500 p.s.i. at 21°±2° C. in the unhydrated state, there further being an effective amount of said acrylate-functional siloxane units present in (A) such that the cured resin possesses an advancing water-in-air contact angle of no greater than 80° at 21°±2° C. in the hydrated state and wherein less than 30 mole percent of the total moles of silicon atoms present in (A) and (B) are derived from said acrylate-functional siloxane units.

4,487,906

THERMOSETTING ORGANOPOLYSILOXANE COMPOSITIONS

Wilfried Kniege, Bergisch Gladbach; Werner Michel, Cologne; Jürgen Ackermann, Bergisch Gladbach, and Karl-Heinz Rudolph, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 13, 1983, Ser. No. 513,477

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1982, 3227018

Int. Cl.³ C08G *77/06*

U.S. Cl. 528—15 **7 Claims**

1. In a polysiloxane rubber composition which vulcanizes under heat to form an elastomer, comprising

(a) a polyorganosiloxane containing unsaturated radicals,

(b) a compound containing Si-H groups,

(c) a platinum-containing addition catalyst, and

(d) an organic peroxide, the improvement which comprises

(e) a compound capable of forming a complex ligand with platinum and selected from the group consisting of triallyl cyanurate, triallyl citrate and bistrimethylsilyl-urea, whereby the storability of the composition is improved.

4,487,907

RTV POLYORGANOSILOXANE COMPOSITIONS YIELDING PAINTABLE ELASTOMERS

Miyoji Fukayama, and Chikara Ichijo, both of Ichihara, Japan, assignors to Toray Silicone Co., Ltd., Tokyo, Japan

Filed Dec. 12, 1983, Ser. No. 560,705

Int. Cl.³ C08G *77/20*

U.S. Cl. 528—32 **14 Claims**

1. A room temperature vulcanizable organosilicon composition which is stable under conditions excluding moisture and which cures in the presence of atmospheric moisture to form a silicone rubber having a paintable surface, said composition comprising the product obtained by mixing

(A) 100 parts by weight of a hydroxyl-terminated polyorganosiloxane exhibiting a viscosity of from 0.02 to 1,000 Pa.s at 25° C.;

(B) from 0.5 to 30 parts by weight of at least one organosilicon compound containing at least two silicon-bonded groups per molecule selected from the group consisting of amide, aminoxy and combinations thereof; and

(C) from 0.05 to 15 parts by weight of a dialkoxysilane of the general formula $XR^1SiR^2(OR^3)_2$ or a partial hydrolysis condensation product thereof, where X represents a mercapto, acryloxy, methacryloxy, or epoxy group, R^1 represents an alkylene, haloalkylene or oxyalkylene radical, and R^2 and R^3 are individually selected from the group consisting of monovalent hydrocarbon radicals, monovalent alkoxyhydrocarbon radicals, and monovalent halohydrocarbon radicals.

4,487,908

REACTION INJECTION MOLDED ELASTOMERS CONTAINING ANHYDRIDES

Richard J. G. Dominguez, Austin, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Feb. 13, 1984, Ser. No. 579,231

Int. Cl.³ C08G *18/32, 18/34, 18/50*

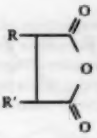
U.S. Cl. 528—48 **18 Claims**

1. A reaction injection molded elastomer comprising the reaction product of ingredients comprising primary or secondary amine terminated polyethers of at least 2,500 molecular weight having greater than 50% of their active hydrogens in the form of amine hydrogen, a chain extender, an aromatic polyisocyanate and an anhydride or mixture of anhydrides in an amount effective to provide improved green strength, represented by the formulae:

a.

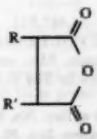
where R,R' is branched or linear C_{1-22} alkyl or aryl, or

b.



where R,R' is H and/or C_{1-22} alkyl or alkenyl and R—C—C—R' may optionally constitute a monocyclic ring system, or

c.



where R,R' is H and/or C_{1-6} alkyl, including cycloaliphatics or where R—C—C—R' are an aromatic ring system.

4,487,909

TERNARY ADHESIVE SYSTEMS CONTAINING A POLYESTER POLYOL, AN ISOCYANATE-POLYESTER-URETHANE, AND A CROSSLINKING AGENT WHICH IS A POLYISOCYANATE

James E. Coughlin, Philadelphia, Pa.; Eugene G. Sommerfeld, Mt. Laurel, N.J., and Clifford H. Strolle, Springfield, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 404,981, Aug. 9, 1982, Pat. No. 4,419,476, which is a continuation-in-part of Ser. No. 310,069, Oct. 9, 1981, abandoned. This application Oct. 3, 1983, Ser. No. 538,271

The portion of the term of this patent subsequent to Dec. 6, 2000, has been disclaimed.

Int. Cl.³ C08G *18/42*

U.S. Cl. 528—60 **17 Claims**

1. A ternary adhesive system consisting essentially of:

A. a polyester polyol of adipic acid having a molecular weight $\overline{M}_n$ of about 1,000–5,000 and soluble in methyl ethyl ketone or ethyl acetate to the extent of at least 65% by weight;

B. an isocyanate-capped polyester-urethane formed from at least one diacid including adipic acid and at least one polyol having a molecular weight $\overline{M}_n$ of about 500–4,000 which has been extended and capped with a diisocyanate in the —NCO/—OH ratio of 2/1–1.3/1 and is capable of forming a block copolymer with and thereby extending polyol A; and

C. a polyisocyanate crosslinking agent C supplying 6–50% by weight in a mixture of B plus C.

4,487,910

PROCESS FOR POLYURETHANE PREPOLYMERS CONTAINING TERMINAL ISOCYANATE GROUPS AND HAVING A REDUCED RESIDUAL MONOMER CONTENT

Haas Bauriedel, Duesseldorf, Fed. Rep. of Germany, assignor to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Feb. 9, 1984, Ser. No. 578,733

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1983, 3306559

Int. Cl.[3] **C08G** *18/10*

U.S. Cl. 528—65 **20 Claims**

1. A process for the preparation of a polyurethane prepolymer containing terminal isocyanate groups from both monocyclic and dicyclic diisocyanates comprising the steps of

a. reacting a monocyclic diisocyanate with a polyhydric alcohol in an OH:NCO ratio of less than 1 to form a prepolymer; and

b. reacting a dicyclic diisocyanate with a polyhydric alcohol in an OH:NCO ratio of less than 1, wherein the reaction is carried out in the prepolymer prepared in step a.

4,487,911

STABLE POLYAMIC ACIDS

Daniel J. Lange, St. Louis, Mo., and Daniel J. Marquardt, Columbia, Ill., assignors to The P. D. George Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 59,533, Jul. 23, 1979, abandoned. This application Jun. 30, 1980, Ser. No. 164,488

Int. Cl.[3] **C08G** *69/32, 73/10, 73/12, 73/14*

U.S. Cl. 528—125 **7 Claims**

1. A two step process of preparing

a shelf stable polyamic acid solution resulting from the reaction of an aromatic tetracarboxylic acid dianhydride and an aromatic diamine in an organic solvent which is inert to the system and is a solvent for at least one of the reactants and the product, a solution of said polyamic acid in a solvent consisting of 80% N-methyl pyrrolidone and 20% of a hydrocarbon solvent of boiling range 310°–345° F. having a viscosity of about 10,000 cps at a concentration of about 10–15%

which comprises:

Step I—reacting an aromatic tetracarboxylic dianhydride of high purity with an aromatic diamine in a molar ratio of about 0.95/1 dianhydride/diamine in an organic reaction solvent which is insert to the system and is a solvent for at least one of the reactants and the product to yield a polyamic acid having a viscosity below about 10,000 cps in about 10–15% solution thereof in a solvent mixture consisting of 80% N-methyl pyrrolidone and 20% of a hydrocarbon solvent of boiling range 310°–345° F.;

Step II—then adding to the Step I product about 0.05 mole of a less pure dianhydride to yield a polyamic acid having a viscosity of about 10,000 cps in about a 10–15% solution in said solvent mixture.

4,487,912

REACTION INJECTION MOLDED ELASTOMERS CONTAINING ACID AMIDES

Robert L. Zimmerman, and Richard J. G. Dominguez, both of Austin, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Feb. 13, 1984, Ser. No. 579,236

Int. Cl.[3] **C08G** *18/32, 18/34, 18/50*

U.S. Cl. 528—52 **19 Claims**

1. A reaction injection molded elastomer comprising the reaction product of ingredients comprising a high molecular weight active hydrogen containing material, a chain extender, an aromatic polyisocyanate and an acid amide in an amount effective to provide improved mold release and hot tear properties.

4,487,913

FUEL AND HYDROLYSIS RESISTANT POLYURETHANE

Daniel A. Chung, North Canton, Ohio, assignor to Goodyear Aerospace Corporation, Akron, Ohio

Filed Mar. 12, 1984, Ser. No. 588,598

Int. Cl.[3] **C08G** *18/42*

U.S. Cl. 528—83 **20 Claims**

1. A polyester polyurethane, comprising:

the reaction product of one or more 1 to 8 carbon atom alkyl substituted trans-1,4-cyclohexanediisocyanate or trans-1,4-cyclohexanediisocyanate and

a mixed polyester, said mixed polyester being (a) a copolymerization condensation product of a glycol with at least two dicarboxylic acids selected from the group consisting of an aliphatic dicarboxylic acid, a cycloaliphatic dicarboxylic acid, and an aromatic dicarboxylic acid, or, (b) a blend of at least two polyesters selected from the group consisting of an aliphatic polyester, a cycloaliphatic polyester, and an aromatic polyester, said aliphatic polyester made from the reaction of an aliphatic dicarboxylic acid and a glycol, a cycloaliphatic polyester made from the reaction of a cycloaliphatic dicarboxylic and a glycol, said aromatic polyester made from the reaction of an aromatic dicarboxylic acid and a glycol,

said aliphatic dicarboxylic acid having from 2 to 12 carbon atoms, said cycloaliphatic dicarboxylic acid having from 7 to 15 carbon atoms, said aromatic dicarboxylic acid having from 8 to 12 carbon atoms, said polyol having a molecular weight of 500 or less, the amount of said aliphatic dicarboxylic acid and said cycloaliphatic aliphatic acid based upon the total amount of said dicarboxylic acids ranging from about 90 percent to about 10 percent by weight,

the molecular weight of said polyester made from said dicarboxylic acids and said polyol ranging from about 500 to about 4,000 and wherein the equivalent ratio of said isocyanate to the OH end groups in said polyester ranges from about 1.5 to about 3.0.

15. A process for making a polyester polyurethane material, comprising the steps of:

reacting trans-1,4-cyclohexanediisocyanate or one or more 1 to 8 carbon atoms alkly substituted trans-1,4-cyclohexanediisocyanate with a mixed polyester, said mixed polyester being (a) a copolymerization condensation product of a glycol with at least two dicarboxylic acids selected from the group consisting of an aliphatic dicarboxylic acid, a cycloaliphatic dicarboxylic acid, and an aromatic dicarboxylic acid, or, (b) a blend of at least two polyesters selected from the group consisting of an aliphatic polyester, a cycloaliphatic polyester, and an aromatic polyester, said aliphatic polyester made from the reaction of an aliphatic dicarboxylic acid and a glycol, said cycloaliphatic polyester made from the reaction of an cycloaliphatic dicarboxylic acid and a glycol, said aromatic polyester made from the reaction of an aromatic dicarboxylic acid and a glycol,

said aliphatic dicarboxylic acid having from 2 to 12 carbon

atoms, said cycloaliphatic dicarboxylic acid having from 7 to 15 carbon atoms, said aromatic dicarboxylic acid having from 8 to 12 carbon atoms, said polyol having a molecular weight of 500 or less, the amount of said aliphatic dicarboxylic acid and said cycloaliphatic dicarboxylic acid based upon the total amount of said dicarboxylic acids ranging from about 90 percent to about 10 percent by weight, the molecular weight of said polyester made from said dicarboxylic acids and said polyol ranging from about 500 to about 4,000, and wherein the equivalent ratio of said polyisocyanate to said OH end groups in said polyester ranges from about 1.5 to about 3.0.

4,487,914

CURING AGENTS FOR EPOXY RESINS

John M. Barton, Farnham, England, assignor to National Research Development Corporation, London, England

Filed Feb. 16, 1984, Ser. No. 580,704

Claims priority, application United Kingdom, Feb. 18, 1983, 8304581

Int. Cl.³ C08G *59/68*

U.S. Cl. 528—92 **15 Claims**

1. A curable composition comprising an epoxy resin or a monoepoxide and a curing agent comprising a metal salt complex of an adduct of an imidazole and a monofunctional epoxy compound.

4,487,915

HYDROXY AROMATIC OLIGOMERS CONTAINING TRIAZINE AND OXAZOLINE GROUPS AND EPOXY RESINS PREPARED THEREFROM

Robert E. Hefner, Jr., Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Feb. 2, 1984, Ser. No. 576,304

Int. Cl.³ C08G *59/26*

U.S. Cl. 528—96 **18 Claims**

1. Hydroxyaromatic oligomer compositions containing both triazine and oxazoline groups prepared by reacting (A) at least one material having an average of more than one aromatic hydroxyl group per molecule with (B) at least 0.01 but not more than 0.95 moles of cyanogen halide or mixture of cyanogen halides per aromatic hydroxyl group in the presence of (C) a suitable base in a quantity of from about 0.01 to about 1.1 moles per aromatic hydroxyl group at a temperature and time sufficient to essentially complete the reaction and thereafter recovering the resultant cyanate mixture; (II) co-oligomerizing the product resulting from (I) with (D) an epoxy resin wherein the mole ratio of epoxy groups to cyanate groups is about 1:1 to about 1:100 in the presence of a suitable co-oligomerization catalyst at a temperature and time to essentially complete the co-oligomerization reaction.

7. An epoxy-containing composition having an average of more than one epoxy group per molecule prepared by dehydrohalogenating the reaction product resulting from reacting an epihalohydrin with a hydroxy aromatic oligomer composition containing both triazine and oxazoline groups prepared by reacting (A) at least one material having an average of more than one aromatic hydroxyl group per molecule with (B) at least 0.01 but not more than 0.95 moles of cyanogen halide or mixture of cyanogen halides per aromatic hydroxyl group in the presence of (C) a suitable base in a quantity of from about 0.01 to about 1.1 moles per aromatic hydroxyl group at a temperature and time sufficient to essentially complete the reaction and thereafter recovering the resultant cyanate mixture; (II) co-oligomerizing the product resulting from (I) with (D) an epoxy resin wherein the mole ratio of epoxy groups to cyanate groups is about 1:10 to about 1:100 in the presence of a suitable co-oligomerization catalyst at a temperature and time to essentially complete to co-oligomerization reaction.

4,487,916

MELT-SPINNABLE COPOLYESTERS

Robert S. Irwin, Wilmington, Del., assignor to E.I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 16, 1983, Ser. No. 562,115

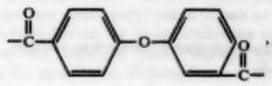
Int. Cl.³ C08G *63/18, 63/66*

U.S. Cl. 528—193 **6 Claims**

1. A copolyester consisting essentially of Units I, II and III, said units having the structural formulas:

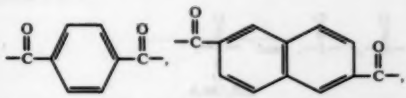
I

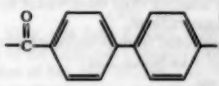
II

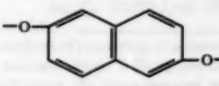


, and

III







, or

Where Units I and II are present in the amount of from about 30 to 50 mole % and Unit III is present in the amount of from 10 to 20 mole %.

4,487,917

COPOLYESTER-CARBONATE RESINS EXHIBITING IMPROVED PROCESSABILITY

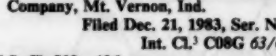
Victor Mark, Evansville, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 21, 1983, Ser. No. 563,762

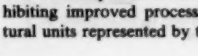
Int. Cl.³ C08G *63/64*

U.S. Cl. 528—196 **31 Claims**

1. Thermoplastic aromatic copolyester-carbonate resin exhibiting improved processability containing recurring structural units represented by the general formulae:



and



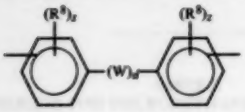
wherein:

R is independently selected from divalent aromatic radicals;

R^1 is selected from divalent aliphatic hydrocarbon radicals,

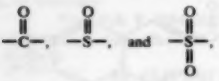
divalent aliphatic ether residues represented by the general formula $(-R^4-O-)_nR^5-$ where R^4 is selected from alkylene radicals and cycloalkylene radicals, R^5 is selected from alkylene radicals and cycloalkylene radicals, and n is a positive integer having a value of from 1 to about 10, and divalent aromatic radicals; and

R^2 is selected from divalent residues of dihydric phenols represented by the general formula



wherein

W is selected from divalent hydrocarbon radicals, —O—, —S—, —S—S—,



R^3 is independently selected from monovalent hydrocarbon radicals and halogen radicals,

z is independently selected from positive integers having a value of from 0 to 4 inclusive, and

d is either zero or one.

4,487,918

PROCESS FOR THE PRODUCTION OF BIFUNCTIONAL POLYPHENYLENE ETHERS

Walter Heitz, Kirchhain, and Wilhelm Risse, Marburg, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

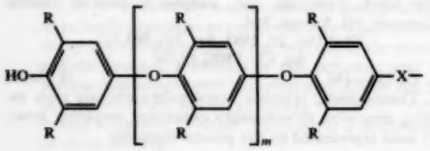
Filed Dec. 30, 1983, Ser. No. 567,325

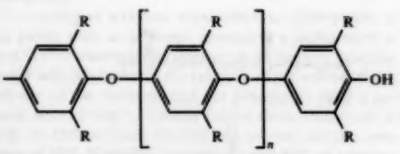
Claims priority, application Fed. Rep. of Germany, Jan. 12, 1983, 3300792

Int. Cl.³ C08G *65/44, 65/48*

U.S. Cl. 528—212 **1 Claim**

1. A process for the production of bifunctional polyphenylene oxides corresponding to the formula

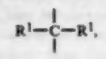




in which

R is the same or different and represents hydrogen or alkyl containing from 1 to 4 carbon atoms;

X is of the formula

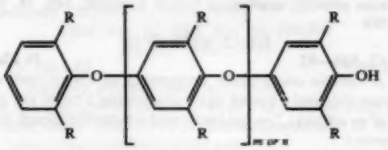


in which R^1 is hydrogen or alkyl containing from 1 to 4 carbon atoms; and

m and n represent an integer of from 0 to 200;

said process comprising reacting 0.5 to 2 moles of carbonyl compounds of the formula

with each mole of polyphenylene ethers of the formula



in an organic solvent, in the presence of a catalyst at a temperature in the range from −30° to 200° C. and a pressure of 0 to 15 bar.

4,487,919

POLYESTER WAXES BASED ON 1,12-DODECANEDIOIC ACID

Jimmy R. Trotter; Frederick B. Joyner, and Richard L. McConnell, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 30, 1983, Ser. No. 509,559

Int. Cl.³ C08G *63/02*

U.S. Cl. 528—272 **24 Claims**

1. A linear polyester wax composition having a melting point less than about 100° C. and a melt viscosity of about 10 cp. to about 2000 cp. at 190° C., a heat fusion of less than 40 cal./g. containing as the acid member at least about 75 mole percent 1,12-dodecanedioic acid, and the acid functioning derivatives thereof, and linear aliphatic and cycloaliphatic glycols having 2 to 10 carbon atoms as the diol member.

4,487,920

POLYAMIDE-POLYOL-TRIAZINE BLOCK COPOLYMER AND ANIONIC POLYMERIZATION PROCESS

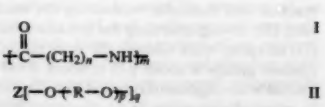
Murali K. Akkapeddi, Morris County, N.J., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Jun. 13, 1983, Ser. No. 503,991

Int. Cl.³ C08G *69/14*

U.S. Cl. 528—323 **35 Claims**

1. An impact modified polyamide/polyether block copolymer molded article having segments of formulae I and II and either III or IV or both III and IV:



I

II

-continued

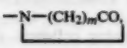
III

IV

with

n is being an integer of 3–12; m being an integer, different for individual segments, of 1–150; Z being a polyfunctional moiety or Z being a single bond; q being an integer corresponding to the functionality of Z; p being an integer, different for individual segments of 1–50; R being alkylene of 2–6 carbons; and R′ being a monofunctional moiety inert during polymerization, selected from the group consisting of alkyl, aryl, dialkylamino, and diarylamino;

with the triazine rings of segments III and IV being bonded only to the amino of segment I or either oxy of segment II, the terminal carbonyl of segment I being bonded only by either oxy of segment II or to a terminal —OH or



the terminal —NH— of segment I being bonded only to the triazine ring of segment III or IV;

the total segment I constituting between about 55 and about 98 weight % of the polymer and the total segment II constituting between about 1% and about 40 weight % of the polymer.

4,487,921

POLYOXADIAZOLE FROM 5-T-BUTYLISOPHTHALIC ACID

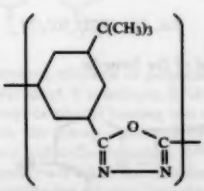
James R. Stephens, Naperville, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Continuation-in-part of Ser. No. 424,607, Sep. 27, 1982, abandoned. This application Nov. 14, 1983, Ser. No. 550,971

Int. Cl.³ C08G 73/08

U.S. Cl. 528—363 **12 Claims**

1. A film and fiber forming crystalline homopolyoxadiazole comprising the repeating structure:



wherein the homopolyoxadiazole has an inherent viscosity of at least about 2 when measured in sulfuric acid at 25° C. at a concentration of 0.5 g/dl.

4,487,922

LAYERED ORGANOPHOSPHOROUS INORGANIC POLYMERS CONTAINING CYCLIC GROUPS

Martin B. Dines, Laguna Beach, and Peter M. DiGiacomo, Mission Viejo, both of Calif., assignors to Occidental Research Corp., Irvine, Calif.

Filed Jul. 24, 1979, Ser. No. 60,077

The portion of the term of this patent subsequent to Mar. 17, 1998, has been disclaimed.

Int. Cl.³ C08G 79/00, 79/04, 79/14

U.S. Cl. 528—395 **14 Claims**

1. Solid inorganic polymers derived from organo group-containing phosphorous or phosphoric acids, in which the organo group is selected from the group consisting of alicyclics, aromatics and heterocyclics wherein, three oxygens bonded to phosphorus are structurally linked to one or more tetravalent metals selected from the group consisting of titanium, zirconium, cerium, hafnium, lead, thorium and uranium, and wherein the molar ratio of phosphorus to tetravalent metal is about 2 to 1.

4,487,923

METHOD OF PREPARING 23-MONOESTERS OF OMT AND DMT

Herbert A. Kirst, and John E. Toth, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation of Ser. No. 330,295, Dec. 14, 1981, abandoned. This application Mar. 14, 1983, Ser. No. 475,271

Int. Cl.³ C07H 1/00, 17/08

U.S. Cl. 536—7.1 **7 Claims**

1. In the method of preparing 23-monoester derivatives of an antibiotic selected from 5-O-mycaminosyl tylonolide and demycinosyltylosin, the improvement which consists of directly acylating the 23-hydroxyl group without protecting the remaining active groups in the antibiotic, said acylation being accomplished with an acylating agent selected from an acid chloride, an acid anhydride or a reactive ester in the presence of an external base at a temperature in the range of from −80° to room temperature until the 23-hydroxyl group of the antibiotic is acylated.

4,487,924

2′-N-(β-LYSYL) AMINOGLYCOSIDES

Isamu Watanabe; Kazuhiro Kamiya, and Toshihito Mori, all of Higashimurayama, Japan, assignors to Kowa Company, Ltd., Nagoya, Japan

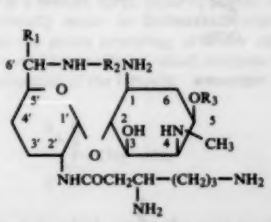
Filed May 13, 1983, Ser. No. 494,556

Claims priority, application Japan, May 14, 1982, 57-80066

Int. Cl.³ C07H 15/22

U.S. Cl. 536—16.1 **4 Claims**

1. A compound of the formula



wherein each of R_1, R_2 and R_3 represents H or CH_3, provided that R_1 and R_2 are not CH_3 at the same time, or an acid addition salt thereof.

4,487,925

REBECCAMYCIN AND PROCESS FOR ITS PREPARATION

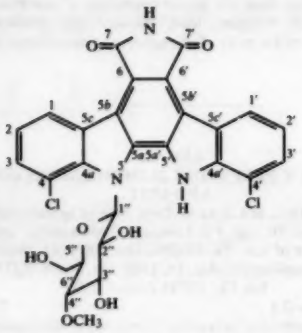
Donald E. Nettleton, Jr., Jordan; James A. Bush, Fayetteville; William T. Bradner, Manlius, and Terrence W. Doyle, Fayetteville, all of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Filed Jan. 28, 1983, Ser. No. 461,817

Int. Cl.³ C07H *17/00*

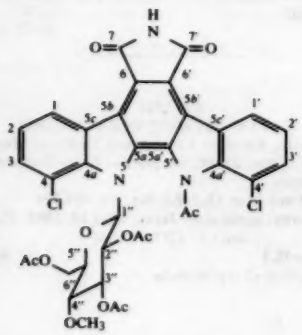
U.S. Cl. 536—24 **3 Claims**

1. The compound rebeccamycin having the formula



I

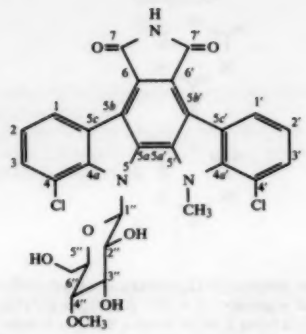
2. The compound rebeccamycin 5',2'',3'',6''-tetraacetate having the formula



II

wherein Ac represents

3. The compound 5'-N-methylrebeccamycin having the formula



III

4,487,926

FLUORINE-CONTAINING CELLULOSE DERIVATIVES

Nobuo Ishikawa, Yokohama, and Hiroki Taniguchi, Himeji, both of Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Filed Jan. 12, 1984, Ser. No. 570,205

Claims priority, application Japan, Jan. 12, 1983, 58-3955

Int. Cl.³ C08B *3/06, 3/16, 3/22*

U.S. Cl. 536—82 **3 Claims**

1. A fluorine-containing cellulose derivative having the general formula:

$$[C_6H_7O_2(OH)_3{-}x\text{-}yRx(OCCF_2{-}CF_3)_y]_n \text{ or}$$

$$\{C_6H_7O_2(OH)_3{-}x\text{-}yRx[OCCF(OCF_2{-}CF)_pOCF_2CF_2CF_3]_p\}_n$$

wherein R is acetyl group which may be partially replaced by propionyl or butyryl group, x is 1.7–2.5, y is 0.05–0.6, p is 0,1,2 or 3 and n is the degree of polymerization.

4,487,927

3-PHOSPHONIUM AND 3-PHOSPHORANYLIDENECEPHEMS

Takao Takaya, Kawanishi; Hisashi Takasugi, Osaka; Takashi Masugi, Ikeda; Hideaki Yamanaka, Hirakata, and Kohji Kawabata, Sumiyoshi, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

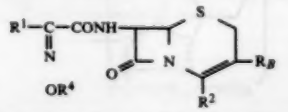
Continuation-in-part of Ser. No. 205,334, Nov. 10, 1980, Pat. No. 7,409,214, and Ser. No. 261,618, May 7, 1981, Pat. No. 4,423,213. This application Jan. 22, 1982, Ser. No. 341,621

Claims priority, application United Kingdom, Nov. 19, 1979, 7939985; Feb. 8, 1980, 8004335; Apr. 21, 1980, 8012991; Jul. 14, 1980, 8022920

Int. Cl.³ C07D *501/24*

U.S. Cl. 544—22 **3 Claims**

1. A compound of the formula:



in which R^1 is amino-substituted-thiazol-4-yl or protected amino-substituted-thiazol-4-yl, R^4 is lower alkyl, or lower alkyl

substituted by carboxy or a protected carboxy group, R_g is a group of the formula:

$$-CH_2P^{\oplus}(R^7)_3.X^{3\ominus} \text{ or } -CH{=}P(R^7)_3$$

wherein R^7 is aryl, and X^3 is halogen, and R^2 is carboxy or a protected carboxy group, or a salt thereof.

4,487,928

PROCESS FOR THE PREPARATION OF POLYISOCYANATES CONTAINING ISOCYANURATE GROUPS, AND THE USE OF THE PRODUCTS OF THE PROCESS AS ISOCYANATE COMPONENT IN THE PRODUCTION OF POLYURETHANES

Roland Richter, Leverkusen; Hanns P. Müller, Odenthal, and Kuno Wagner, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Dec. 23, 1981, Ser. No. 333,943

Claims priority, application Fed. Rep. of Germany, Jan. 8, 1981, 3100262

Int. Cl.³ C07D *251/34*; C08G *73/06, 18/28, 18/70*

U.S. Cl. 544—193 **4 Claims**

1. A process for the preparation of polyisocyanates containing isocyanurates groups which comprises trimerizing a part of the isocyanate groups of organic polyisocyanates or of mixtures of di- and mono-isocyanates in the presence of basic compounds as trimerization catalysts and terminating the trimerization reaction by the addition of a catalyst poison, characterized in that said trimerization catalysts are 1:1-complexes of (i) potassium carboxylates having 1 to 4 carbon atoms and (ii) 1,4,7,10,13,16-hexaoxacyclooctadecane.

4,487,929

INTERMEDIATES FOR PYRAZOLOPYRIDAZINE DERIVATIVES

Cedric H. Hassall, Harpenden; Geoffrey Lawton, Hitchin, and Christopher J. Moody, Stevenage, all of England, assignors to Hoffmann-La Roche, Inc., Nutley, N.J.

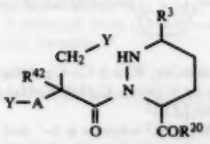
Division of Ser. No. 272,351, Jun. 10, 1981, Pat. No. 4,399,136. This application Apr. 25, 1983, Ser. No. 488,508

Claims priority, application United Kingdom, Jun. 13, 1980, 8019342; Mar. 11, 1981, 8107621

Int. Cl.³ C07D *237/04*

U.S. Cl. 544—224 **1 Claim**

1. A compound of the formula



wherein A is methylene, ethylene or propylene which may be substituted by lower alkyl, Y is halogen, R^3 is hydrogen, lower alkyl, benzyl, phenyl or phenyl bearing one or more substituents selected from the group consisting of halogen, lower alkyl, lower alkoxy and trifluoromethyl, R^{20} is lower alkoxy and R^{42} is hydrogen, lower alkyl, benzyl, phenyl, phenyl bearing one or more substituents selected from the group consisting of halogen, lower alkyl, lower alkoxy and trifluoromethyl or a group of the formula —A—Y in which A and Y are as described above.

4,487,930

6-[(CYCLIC AMINO)ALKYLAMINO]-TETRAHYDROTRIAZOLO[3,4-A]PHTHALAZINES

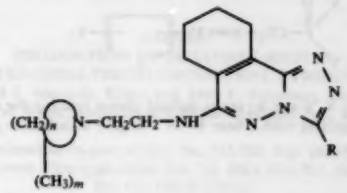
Norton P. Peet, and Catherine A. Alexander, both of Indianapolis, Ind., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 7, 1982, Ser. No. 414,766

Int. Cl.³ C07D *487/04*; A61K *31/50*

U.S. Cl. 544—234 **5 Claims**

1. A compound of the formula



wherein R is hydrogen or alkyl of 1–4 carbon atoms; m is 0 or 1; and n is 4 or 5; and the pharmaceutically acceptable acid addition salts thereof.

4,487,931

PROCESS FOR THE PREPARATION OF 2-(THIEN-2-YL)- AND 2-(THIEN-3-YL)-ETHYLAMINE DERIVATIVES

Isaac Chekroun, Toulouse, and Alain Heymès, Sisteron, both of France, assignors to Sanofi, Toulouse, France

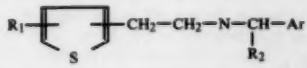
Filed Jun. 29, 1982, Ser. No. 393,384

Claims priority, application France, Jun. 30, 1981, 81 13063

Int. Cl.³ C07D *409/12, 333/20*

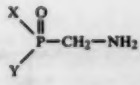
U.S. Cl. 546—280 **10 Claims**

9. Process for the preparation of 3-(thien-2-yl)- and 2-(thien-3-yl)-ethylamine derivatives of the formula:



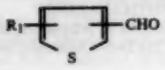
(I)

in which R_1,in the 2-, 3-, 4- or 5-position, is hydrogen, halogen, nitro, a linear or branched lower alkyl, lower alkoxy, thienyl, furyl, pyridyl, phenyl or naphthyl group, which is optionally mono- or disubstituted with a member selected from the group consisting of lower alkyl, phenyl, halogen, nitro and lower alkoxy, R_2 is a member selected from the group consisting of hydrogen atom, a linear or branched lower alkyl, thienyl, furyl, pyridyl, phenyl or naphthyl, which is optionally mono- or disubstituted with a member selected from the group consisting of lower alkyl, phenyl, halogen, nitro, and lower alkoxy, and Ar is a thienyl, furyl, pyridyl, phenyl or naphthyl, which is optionally mono- or disubstituted with a member selected from the group consisting of lower alkyl, phenyl, halogen, nitro, and lower alkoxy, which comprise the steps of reacting a compound of the formula:



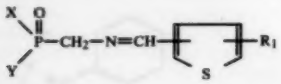
(II)

in which X and Y, which can be the same or different, are members selected from the group consisting of lower alkyl, lower alkoxy, aryl, aryloxy, diarylamino or dialkylamino, with a carbonyl compound of the formula:



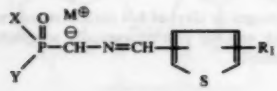
(III)

in which R_1 is as defined above, to give a compound of the formula:



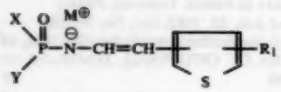
(IV)

in which X, Y and R_1 are as defined above, treating the resulting compound with a base B^-M^+ to give a carbanion of the formula:



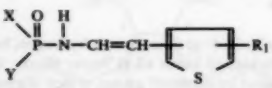
(V)

in which X, Y and R_1 are as defined above, heating the resulting compound so as to form a compound of the formula:



(VI)

in which X, Y and R_1 are as defined above, treating the resultant compound with water so as to form a compound of the formula:

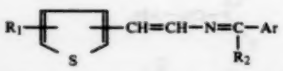


(VII)

in which X, Y and R_1 are as defined above, successively treating the resulting compound with a base $B'^-M'^+$ and then with a carbonyl compound of the general formula:

(VIII)

in which Ar and R_2 are as defined above, to give a compound of the formula:



(IX)

in which R_1, R_2 and Ar are as defined above, and then, treating the resulting compound with a reducing agent so as to form a compound of the formula (I).

4,487,932

2,6-DIMETHYL-3,5-BIS-(1-ADAMANTYLHYDROXYCARBONYL)-4-(2-DIFLUOROMETHOXYPHENYL)-1,4-DIHYDROPYRIDINE

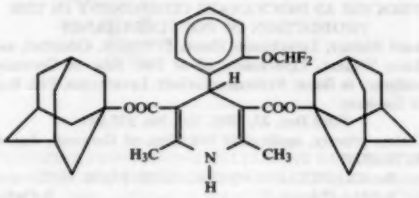
Egils A. Biseniex; Maris M. Veveris; Gunar Y. Dubur; Yanis J. Polis, all of Riga; Yan R. Uldrikis, Elgava; Natalia V. Barmenkova, and Agris A. Kimenis, both of Riga, all of U.S.S.R., assignors to Institut Organicheskogo Sinteza Akademii Nauk Latviiskoi, Riga, U.S.S.R.

Filed Apr. 19, 1983, Ser. No. 486,408

Int. Cl.³ C07D *211/90*

U.S. Cl. 546—285 **1 Claim**

1. 2,6-Dimethyl-3,5-bis-(1-adamantylhydroxycarbonyl)-4-(2-difluoromethoxyphenyl)-1,4-dihydropyridine of the formula



4,487,933

TITANIUM CATALYZED TRANSESTERIFICATION

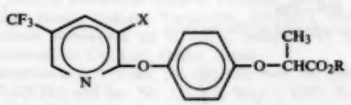
Craig E. Mixan, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 330,366, Dec. 14, 1981, abandoned. This application May 5, 1983, Ser. No. 491,680

Int. Cl.³ C07D *213/64*

U.S. Cl. 546—302 **11 Claims**

1. A process for transesterifying compounds having the formula



wherein X is hydrogen or chlorine, R is a C_1–C_8 straight or branched chain alkyl group or a group $C_2H_4(OC_2H_4)_xOR^2$, $CH(CH_3)CH_2[OCH(CH_3)CH_2]_xOR^2$ or $CH_2CH(CH_3)[OCH(CH_3)CH_2]_xOR^2$ where x is 0–1 and R^2 is a C_1–C_4 straight or branched chain alkyl group which consists essentially of reacting said compounds under substantially anhydrous conditions and at a temperature of from 80° to 150° C. with an alcohol having the formula R^1OH wherein R^1 is a C_2–C_8 straight or branched chain alkyl group or a group $C_2H_4(OC_2H_4)_nOR^3$, $CH(CH_3)CH_2[OCH(CH_3)CH_2]_nOR^3$ or $CH_2CH(CH_3)[OCH(CH_3)CH_2]_nOR^3$ where n is 0–2 and R^3 is a straight or branched chain alkyl group having 1 to 4 carbon atoms in the presence of a catalyst selected from TiO_2, $TiCl_4$ or $Ti(OR^4)_4$ where R^4 is alkyl and where ROH and R^4OH are lower boiling than R^1OH or where R^4 is R^1.

4,487,934

METHOD OF PREPARING POLY-SUBSTITUTED ACYLBENZENES

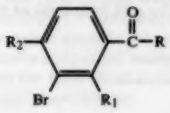
Gregory M. Shutske, Somerset, and Linda L. Setescak, Somerville, both of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Filed Jun. 6, 1980, Ser. No. 157,916

Int. Cl.[3] **C07D** *213/56, 309/32;* **C07C** *49/80*

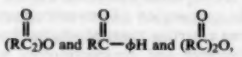
U.S. Cl. 546—314 **18 Claims**

1. A method of preparing a poly-substituted acylbenzene having a structural formula of

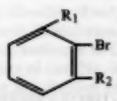


where R_1 and R_2 are the same or different and are selected from the group consisting of lower alkoxy and hydroxy, R is selected from the group consisting of (a) a lower alkyl, and (b) a monoor polycyclic aromatic or heteroaromatic having substituents thereon of $(X)_m$ and $(Y)_n$ where X and Y are the same or different and are selected from the group consisting of halogen, lower alkyl, lower alkoxy, lower alkylthio, trifluoromethyl and nitro, and m and n are the same or different integers and may vary from 0 to 2, which comprises reacting a first reactant selected from the group consisting of

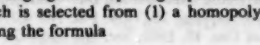
a mixture of



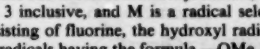
where R is as defined above, with a second reactant having a formula of



where R_1 and R_2 are as defined above, in the presence of an acylating agent comprising a perfluorosulfonic acid polymer which is selected from (1) a homopolymer of a vinyl ether having the formula



where R_f is a radical selected from the group consisting of fluorine and perfluoralkyl radicals having from 1 to 10 carbon atoms, Y is a radical selected from the group consisting of fluorine and the trifluoromethyl radical, n is an integer of from 1 to 3 inclusive, and M is a radical selected from the group consisting of fluorine, the hydroxyl radical, the amine radical and radicals having the formula —OMe, where Me is a radical selected from the class consisting of alkali metals and quaternary ammonium radicals and (2) a copolymer of the vinyl ether of (1) above and a monomer selected from the group consisting of (a) ethylene, (b) halogenated ethylenes and (c) one monomer selected from ethylene and halogenated ethylenes and one monomer selected from perfluorinated alpha-olefins and perfluoro alkyl vinyl ethers having the formula



where n' is 0 to 5.

4,487,935

PRODUCTION OF MIXTURES RICH IN 6-CHLORO-2-TRICHLOROMETHYL PYRIDINE

Michael J. Marinak, Kelso, and John L. Simonson, Longview, both of Wash., assignors to Kalama Chemical, Inc., Kalama, Wash.

Continuation-in-part of Ser. No. 422,754, Sep. 24, 1982, abandoned. This application Feb. 22, 1983, Ser. No. 468,283

Int. Cl.[3] **C07D** *213/60*

U.S. Cl. 546—345 **5 Claims**

1. The process of producing high yields of mixtures rich in 6-chloro-2-trichloromethyl pyridine by liquid phase noncatalytic chlorination of alpha-picoline hydrochloride without substantial formation of intractable nonvolatiles, said process comprising:

(a) establishing in a first and second reactor means an anhydrous diluent reactor charge which is made up of chlorinated pyridine and/or picoline compounds, said diluent being essentially nonreactive with chlorine in the sense of not forming hydrogen chloride therewith under the reaction conditions to which the reactants in said first and second reactor means are subjected;

(b) while maintaining the reactor charge in said first reactor means in the liquid phase and at a temperature of about 170° C. to about 250° C., sparging both chlorine and alpha-picoline hydrochloride into the reactor charge near the bottom thereof at a chlorine-to-picoline feed ratio of at least about 8:1 by weight and at a feed rate low enough so that any separation of the reactor charge into a second, lighter phase composed of unchlorinated alpha-picoline hydrochloride is minimized and is in any event less than about 10% of the reactor charge by volume, the excess of chlorine being fed to the reactor charge relative to the amount of alpha-picoline hydrochloride being fed thereto providing enhanced agitation of the reaction mass and sufficient chlorine to ensure that the chlorine partial pressure in the vapor space over the reactor charge is greater than 50%, such reaction conditions being maintained until substantial quantities of 2-trichloromethyl pyridine and 6-chloro-2-trichloromethyl pyridine are formed;

(c) transferring excess chlorine, hydrogen chloride, and entrained products by a heated vent line and sparger from said first reactor means to said second reactor means;

(d) transferring overflow liquid from said first reactor means to said second reactor means;

(e) continuing chlorine addition and maintaining the reaction mass in the liquid phase at a temperature within the range indicated of about 170° C. to about 250° C. in said second reactor means;

(f) transferring overflow liquid from said second reactor means to a third, finishing reactor means; and

(g) continuing chlorine feed and heating of the reaction mass, without further alpha-picoline hydrochloride feed, in the liquid phase at a temperature of at least about 200° C. in said third, finishing reactor means for a time sufficient to cause chlorination of substantially all 2-trichloromethyl pyridine present to form 6-chloro-2-trichloromethyl pyridine.

4,487,936

PREPARATION OF ALKYLTHIOBENZIMIDAZOLES

Sándor Szöke, Budapest; György Lugosi, Felsö-Göd; Mária Bakonyi, Budapest; Jenö Ghyczy, Budapest, and György Csermely, Budapest, all of Hungary, assignors to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Rt., Budapest, Hungary

Division of Ser. No. 212,628, Dec. 3, 1980, Pat. No. 4,368,328. This application Sep. 30, 1982, Ser. No. 428,915

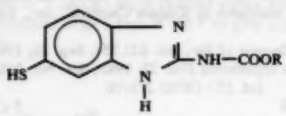
Claims priority, application Hungary, Dec. 4, 1979, CI 1993

The portion of the term of this patent subsequent to Jun. 11, 2000, has been disclaimed.

Int. Cl.³ C07D *235/04*

U.S. Cl. 548—139 **2 Claims**

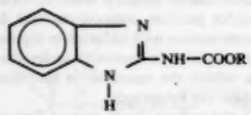
1. A process for the preparation of a compound of the formula (IV)



(IV)

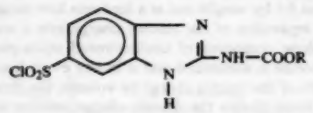
wherein R is alkyl having 1 to 3 carbon atoms, or a salt thereof which comprises the steps of

(a) chlorosulfonating a compound of the formula (I)



(I)

with chlorosulfonic acid at a temperature between 15° and 40° C. to form a compound of the formula (III)



(III)

and,

(b) reducing the compound of the formula (III) at a temperature between 0° and 100° C. with a metal or metal salt, capable of reducing a compound of the formula III in an aqueous acidic medium to form the desired product.

4,487,937

2-(2-SUBSTITUTEDAMINO-4-THIAZOLYL)-2-(1-METHOXY-ISOPROPOXYIMINO)-ACETIC ACIDS

René Heymes, Romainville, France, assignor to Roussel Uclaf, Paris, France

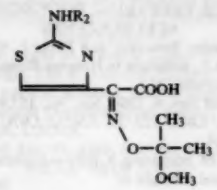
Division of Ser. No. 260,311, May 4, 1981, Pat. No. 4,386,210, which is a division of Ser. No. 886,421, Mar. 14, 1978, Pat. No. 4,288,434. This application Feb. 25, 1983, Ser. No. 469,710

Claims priority, application France, Mar. 25, 1977, 77 08988; Dec. 5, 1977, 77 36512

Int. Cl.³ C07D *277/46*

U.S. Cl. 548—194 **2 Claims**

1. A syn isomer of a compound of the formula



wherein R_2 is selected from the group consisting of chloroacetyl and a group easily removable by acid hydrolysis or hydrogenolysis.

4,487,938

TETRANITROGLYCOLURIL AND METHOD OF PREPARATION THEREOF

Jacques Boileau, Paris; Jean-Marie L. Emeury, Sorgues, and Jean-Paul Kehren, Angouleme, all of France, assignors to Societe Nationale des Poudres et Explosifs, Paris, France

Continuation-in-part of Ser. No. 184,153, Sep. 4, 1980, abandoned, which is a continuation-in-part of Ser. No. 486,405, Jul. 8, 1974,. This application Sep. 21, 1982, Ser. No. 420,810

Claims priority, application France, Jul. 24, 1973, 73 27038

Int. Cl.³ C07D *487/04*; C06B *25/34, 49/00*

U.S. Cl. 548—304 **9 Claims**

1. Tetranitroglycoluril having a rate of detonation at least equal to 9073 meters per second under a density charge of 1.94, having a decomposition temperature of about 200° C. which is stable at a temperature of up to 100° C. and is soluble in dioxane to the extent of 17 g in 100 cc at 27° C. and in acetic acid to the extent of 15.7 in 100 cc at the temperature of 25° C.

6. A process for the preparation of tetranitroglycoluril, which consists of nitrating a starting material selected from the group consisting of glycoluril and dinitroglycoluril with a mixture of nitric acid and dinitrogen pentoxide at a temperature between −5° C. and 50° C., allowing the product to precipitate and filtering the product from the reaction mixture.

4,487,939

N-(HYDROXYMETHYL)-N-(1,3-DIHYDROXYMETHYL-2,5-DIOXO-4-IMIDAZOLIDINYL)-N'-(HYDROXYMETHYL)UREA

Philip A. Berke, Madison, and William E. Rosen, Summit, both of N.J., assignors to Sutton Laboratories, Inc., Chatham, N.J.

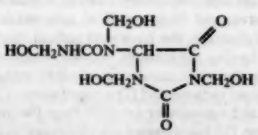
Division of Ser. No. 70,502, Aug. 28, 1979, Pat. No. 4,271,176. This application Dec. 10, 1980, Ser. No. 214,993

The portion of the term of this patent subsequent to Jun. 2, 1998, has been disclaimed.

Int. Cl.³ C07D *233/60*

U.S. Cl. 548—311 **1 Claim**

1. A condensation product of formaldehyde and allantoin in the proportion of four moles of formaldehyde to one mole of allantoin having the structural formula:



4,487,940

WET ADHESION PROMOTERS FOR EMULSION POLYMERS

Kazys Sekmakas, Palatine, and Raj Shah, Schaumburg, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Jul. 8, 1983, Ser. No. 511,992
Int. Cl.³ C07D 233/36
U.S. Cl. 548—320 8 Claims

1. An acrylate or methacrylate functional copolymerizable monomer which is the adduct formed by reacting an aminoalkyl alkylene urea with about 0.9 up to about 1.5 molar proportions of a saturated monoepoxide to consume most or all of one of the two amino hydrogen atoms available on said alkylene urea, and then reacting with about 0.8 up to about 2.0 molar proportions of a monoisocyanate having a single acrylate or methacrylate group in the presence of at least 0.02%, based on the total weight of the reactants present, of an inhibitor which retards the free-radical polymerization of ethylenic unsaturation, and phenothiazine.

4,487,941

WET ADHESION PROMOTERS FOR EMULSION POLYMERS

Kazys Sekmakas, Palatine, and Raj Shah, Schaumburg, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Jul. 8, 1983, Ser. No. 511,993
Int. Cl.³ C07D 233/36
U.S. Cl. 548—320 8 Claims

1. An acrylate or methacrylate functional copolymerizable monomer which is the adduct formed by reacting an aminoalkyl alkylene urea with about 0.9 up to about 1.5 molar proportions of a saturated monoepoxide to consume most or all of one of the two amino hydrogen atoms available on said alkylene urea, and then reacting with about 0.8 up to about 2.0 molar proportions of glycidyl acrylate, glycidyl methacrylate, or a mixture thereof in the presence of at least 0.02%, based on the total weight of the reactants present, of an inhibitor which retards the free-radical polymerization of ethylenic unsaturation, and phenothiazine.

4,487,942

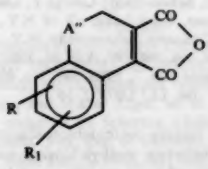
6,7-DIHYDRO-5H-BENZOCYCLOHEPTENE-8,9-DICARBOXYLIC ACID ANHYDRIDES

Hans Zweifel, Basel; Walter Schilling, Himmelried; Angelo Storni, Rheinfelden, and Daniel Bellus, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 349,419, Feb. 16, 1982, Pat. No. 4,414,394, which is a division of Ser. No. 183,905, Sep. 4, 1980, Pat. No. 4,337,200, which is a continuation-in-part of Ser. No. 9,985, Feb. 6, 1979, Pat. No. 4,242,264. This application Jul. 20, 1983, Ser. No. 515,413
Claims priority, application Switzerland, Feb. 8, 1978, 1400/78
Int. Cl.³ C07D 307/93
U.S. Cl. 549—236 2 Claims

1. A compound of the formula V

(V)



in which A'' is $—CH_2CH_2$, and R and R_1 independently of one another are hydrogen, halogen, alkyl having 1–4 C atoms or methoxy.

4,487,943

CATALYTIC PROCESS FOR THE PREPARATION OF TETRAHYDROPYRAN BY HOMOLOGATION OF TETRAHYDROFURAN

William A. Beavers, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 9, 1983, Ser. No. 559,986
Int. Cl.³ C07D 309/04
U.S. Cl. 549—356 18 Claims

1. A process for the preparation of tetrahydropyran which comprises reacting tetrahydrofuran with a mixture of carbon monoxide and hydrogen at a temperature of about 100° to 400° C. and a pressure of about 200 to 20,000 psig in the presence of a homogeneous catalyst system comprising ruthenium and rhodium.

4,487,944

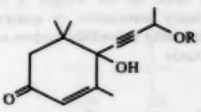
ACETYLENIC AND ALLENIC CARBINOLS, THEIR UTILIZATION AS STARTING MATERIALS FOR THE PREPARATION OF β-DAMASCENONE AND PROCESS FOR PREPARING SAME

Karl-Heinrich Schulte-Elte, Onex, and Bernard Müller, Geneva, both of Switzerland, assignors to Firmenich, SA, Switzerland

Filed Sep. 27, 1983, Ser. No. 536,258
Claims priority, application Switzerland, Nov. 18, 1982, 6713/82
Int. Cl.³ C07D 309/06; C07C 49/543
U.S. Cl. 549—416 2 Claims

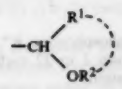
1. An acetylenic carbinol of formula

(I)



wherein symbol R stands for a trialkyl-silyl or a C_1 to C_6 alkyl radical, or a group of formula

(II)



wherein, when taken separately each of symbols R^1 and R^2 represents a lower alkyl radical, or when taken together, R^1 and R^2 represent a tetramethylene group.

4,487,945

PREPARATION OF 2-EXO-HYDROXY-7-OXABICYCLO[2.2.1]HEPTANES

George B. Payne, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 414,548, Sep. 8, 1982, abandoned, which is a continuation-in-part of Ser. No. 331,095, Dec. 16, 1981, abandoned. This application Dec. 8, 1983, Ser. No. 559,512
Int. Cl.³ C07D 493/08
U.S. Cl. 549—463 18 Claims

1. A process for the preparation of a 2-exo-hydroxy-7-oxabicyclo[2.2.1]heptane which comprises treating a cis-epoxycyclohexanol with acid in an inert solvent and recovering a 2-exo-hydroxy-7-oxa-bicyclo[2.2.1]heptane.

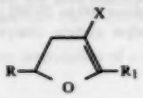
4,487,946

PROCESS FOR THE ISOMERIZATION OF CYCLOPROPYL KETONES TO 2,3-DIHYDROFURANS

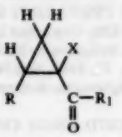
Allen L. Hall, Amelia, and Richard G. Fayter, Jr., Fairfield, both of Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

Filed Jun. 13, 1983, Ser. No. 503,952
Int. Cl.³ C07D 307/28, 307/30
U.S. Cl. 549—474 8 Claims

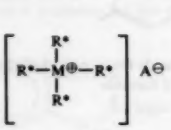
1. A process for the rearrangement of cyclopropyl ketones to obtain 2,3-dihydrofurans corresponding to the formula



wherein R and R_1 are hydrocarbon radicals having from 1 to 24 carbon atoms and X is a carboxylate, nitrile, amide or sulfonyl group which comprises heating a cyclopropyl ketone, which is essentially free of water and caustic and corresponds to the formula



where R, R_1 and X are the same as defined above, at a temperature in the range 60° C. to 200° C. and in the presence of 0.5 to 20 weight percent, based on the weight of the cyclopropyl ketone, of a quaternary ammonium or quaternary phosphonium compound containing at least six carbon atoms and corresponding to the formula



where M is nitrogen or phosphorous, R* represents a hydrocarbon radical having from 1 to 22 carbon atoms and A is halide, to effect isomerization.

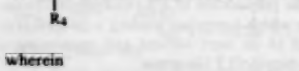
4,487,947

SUBSTITUTED 1,11-DIAMINOUNDECANES, PROCESSES FOR PRODUCING THEM, AND THEIR USE

Dieter Reinehr, Kandern, Fed. Rep. of Germany, and Josef Pfeifer, Therwil, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 288,853, Jul. 31, 1981, , which is a continuation of Ser. No. 083,141, Oct. 9, 1979, abandoned. This application Sep. 22, 1982, Ser. No. 421,208
Claims priority, application Switzerland, Oct. 18, 1978, 10770/78
Int. Cl.³ C07D 307/06, 307/04
U.S. Cl. 549—492 2 Claims

1. A compound of the formula I



wherein

R_1 is alkyl having 1–12 C atoms,
R_2 is hydrogen or alkyl having 1–12 C atoms,
R_3 is 2-furyl,
R_4 is hydrogen or alkyl having 1–12 C atoms, or
R_1 and R_2 together are alkylene having 3–11 C atoms, and
R_5 and R_6 independently of one another are hydrogen or methyl.

4,487,948

POLYGLYCIDYL HINDERED AROMATIC AMINES

David A. Shimp, Prospect, and Richard B. Graver, Louisville, both of Ky., assignors to Celanese Corporation, New York, N.Y.

Filed Mar. 23, 1983, Ser. No. 477,993
Int. Cl.³ C07D 303/36
U.S. Cl. 549—552 7 Claims

1. Polyglycidyl amines wherein the amine is a sterically hindered aromatic diamine containing two primary amine groups attached directly to carbon atoms in the aromatic nucleus wherein the carbon atoms are not adjacent to each other, wherein the aromatic diamine is mononuclear or dinuclear, wherein the dinuclear diamine contains one primary amine group attached to each aromatic nucleus and wherein the aromatic nuclei are linked through a methylene bridge, wherein each position ortho to each amine group contains an alkyl substituent having one to three carbon atoms and wherein the polyglycidyl amine contains an epoxide functionality between 3 and 4.

4,487,949

PROCESS FOR THE PREPARATION OF ALKYL SILICATES

Charles B. Mallon, Belle Mead, N.J., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Nov. 22, 1983, Ser. No. 554,292
Int. Cl.³ C07C 7/04, 7/08, 7/18
U.S. Cl. 556—470 11 Claims

1. Method of synthesizing tetraalkyl orthosilicates which comprises the steps of:

(A) calcining a mixture of cupric oxide and silicon particles containing about 1 to about 10 weight percent of cupric oxide at a temperature of about 400°–1,000° C. for at least about 0.5 hours under an inert gas atmosphere; and

(B) contacting the mixture treated in step (A) with a stoichiometric excess of an alkanol, having one to about four carbons, based on the weight of silicon in said mixture, at a temperature of about 120°–250° C. until a tetraalkyl silicate is obtained.

4,487,950

METHOD FOR MAKING METHYLCHLOROSILANES

William J. Ward, III, Schenectady; George L. Gaines, Jr., Scotia, and Alan Ritzer, Sand Lake, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 368,799, Apr. 16, 1982, abandoned. This application Jan. 7, 1983, Ser. No. 456,470
Int. Cl.³ C07F 7/16
U.S. Cl. 556—472 10 Claims

1. A method for making methylchlorosilanes comprising, effecting reaction between methylchloride and powdered silicon in the presence of a copper-silicon catalyst, where the copper-silicon catalyst is based on the use of a particulated mixture of silicon, partially oxidized copper and copper formate.

4,487,951

N-PHENYLSULFONYLCARBAMATES

Werner Föry, Basel; Karl Gass, Magden; Willy Meyer, Riehen, and Rolf Schurter, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

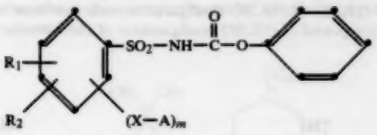
Division of Ser. No. 396,959, Jul. 9, 1982, Pat. No. 4,443,243. This application Jan. 19, 1984, Ser. No. 571,976

Claims priority, application Switzerland, Jul. 16, 1981, 4667/81

Int. Cl.³ C07C *143/83*

U.S. Cl. 560—12 9 Claims

1. An N-phenylsulfonylcarbamate of the formula VII



VII

wherein

A is a C_3–C_6 alkynyl group,

X is oxygen, sulfur or a sulfinyl or sulfonyl bridge,

m is the number one or two,

R_1 is hydrogen, halogen C_1–C_5-alkyl or C_2–C_5-alkenyl or a group —Y—R_5,

R_2 is hydrogen, halogen, C_1–C_5-alkyl, C_2–C_5-alkenyl or C_1–C_4-haloalkyl, or a group —Y—R_5, —$COOR_6$, —NO_2 or —CO—NR_7—R_8,

R_5 and R_6 are each C_1–C_5-alkyl, C_2–C_5-alkenyl or C_2–C_6-alkynyl,

R_7 and R_8 are each hydrogen, C_1–C_5-alkyl, C_2–C_5-alkenyl or C_2–C_6-alkynyl, and

Y is oxygen, sulfur or a sulfinyl or sulfonyl bridge.

4,487,952

PREPARING CARBAMIC ACID ESTERS

William Giroldini, Milan, Italy, assignor to Anic S.p.A., Palermo, Italy

Filed Feb. 3, 1983, Ser. No. 463,555

Claims priority, application Italy, Feb. 9, 1982, 19519 A/82

Int. Cl.³ C07C *125/063, 125/07*

U.S. Cl. 560—24 5 Claims

1. A process for the preparation of esters of carbamic acids comprising the step of reacting aromatic nitrocompounds with carbon monoxide in the presence of alcohols and catalysts selected from the group consisting of iron selenide, tin selenide, manganese selenide, vanadyl selenide and mixtures thereof and a cocatalyst comprising potassium iodide and pyridin as a reaction temperature between 100° C. and 200° C. and a pressure between 1 atm and 40 atm.

4,487,953

9-BROMOPROSTAGLANDINS, THEIR PREPARATION, AND THEIR USE AS MEDICAMENTS

Werner Skuballa; Bernd Raduechel; Norbert Schwarz; Helmut Vorbrueggen, and Walter Elger, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

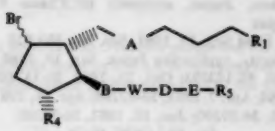
Filed Dec. 6, 1982, Ser. No. 446,888

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1981, 3148743

Int. Cl.³ C07C *177/00*

U.S. Cl. 560—55 37 Claims

1. A 9-bromoprostane of the formula



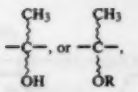
wherein the 9-bromine atom is in the α- or β-position,

R_1 is CH_2OH or $C(O)OR_2$ wherein R_2 is (a) hydrogen, (b) C_{1-10} alkyl, (c) C_{1-10} alkyl substituted by halogen; C_{1-4} alkoxy; C_{6-10} aryl; C_{6-10} aroyl; C_{6-10} aryl or C_{6-10} aroyl each substituted by 1–3 halogen atoms, phenyl, 1–3 C_{1-4} alkyl groups or a chloromethyl, fluoromethyl, trifluoromethyl, carboxy, hydroxy or C_{1-4} alkoxy group; di-C_{1-4}-alkylamino; or tri-C_{1-4}-alkylammonium; (d) C_{3-10} cycloalkyl, (e) C_{3-10} cycloalkyl substituted by C_{1-3} halogen atoms, phenyl, 1–3 C_{1-4} alkyl groups or a chloromethyl, fluoromethyl, trifluoromethyl carboxy, hydroxy or C_{1-4} alkoxy group, or (h) an aromatic heterocycle of 5 or 6 ring atoms one of which is O, N or S, the remainder being carbon atoms; or R_1 is $C(O)NHR_3$ wherein R_3 is an acyl group of a hydrocarbon C_{1-15} carboxylic or sulfonic acid or is R_2;

A is —CH_2—CH_2— or cis—CH=CH—;

B is —CH_2—CH_2—, trans—CH=CH—, or —C≡C;

W is hydroxymethylene, RO-methylene,



wherein OH or OR is in the α- or β- position;

R is tetrahydropyranyl, tetrahydrofuranyl, α-ethoxyethyl, trimethylsilyl, dimethyl-tert-butylsilyl, tribenzylsilyl or an acyl group of a C_{1-15}-hydrocarbon carboxylic or sulfonic acid;

D and E together are a direct bond, or

D is alkylene, alkenylene, cycloalkylene or cycloalkenylene, each of 1–10 carbon atoms, or one of said groups substituted by fluorine, and

E is oxygen, sulfur, a direct bond, —C≡C—, or —CR_6=C-R_7—, wherein R_6 and R_7 are different from each other and each is hydrogen, chlorine, or C_1–C_4-alkyl;

R_4 is OH or OR; and

R_5 is (a) hydrogen, (b) C_{1-10}-alkenyl each substituted by halogen, C_{1-4}-alkyl, C_{6-10}-aryl or by C_{6-10}-aryl substituted by 1–3 halogen atoms, phenyl, 1–3 C_{1-4} alkyl groups or a chloromethyl, fluoromethyl, trifluoromethyl, carboxy, hydroxy or C_{1-4} alkoxy group; (e) when D and E together are a direct bond, R_5 can also be C_{2-6}-alkynyl or C_{2-6}-alkynyl substituted in the 1-position by fluorine or C_{1-4}-alkyl, (f) C_{3-10} cycloalkyl, (g) C_{3-10} cycloalkyl substituted by C_{1-4} alkyl, (h) C_{6-10} aryl, (i) C_{6-10} aryl substituted by 1–3 halogen atoms, phenyl, 1–3 C_{1-4} alkyl groups or a chloromethyl, fluoromethyl, trifluoromethyl, carboxy, hydroxy or C_{1-4} alkoxy group; or (j) an aromatic heterocycle of 5 or 6 ring atoms one of which is O, N or S, the remainder being carbon atoms;

or, when R_2 is hydrogen, a physiologically compatible salt thereof with a base, with the proviso that the compound is not 9-deoxy-9β-bromo-16,16-dimethyl-PGF_2, an ester thereof or a salt thereof.

4,487,954
CARBOXYLIC ACID CYCLOHEXYL ESTER DERIVATIVES

Shigeru Sugimori; Tetsuhiko Kojima, and Masakazu Tsuji, all of Kanagawaken, Japan, assignors to Chisso Corporation, Osaka, Japan

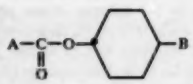
Filed Sep. 17, 1981, Ser. No. 303,523

Claims priority, application Japan, Sep. 19, 1980, 55-130331; Oct. 14, 1980, 55-143393; Oct. 21, 1980, 55-147109; Mar. 28, 1981, 56-46064; Apr. 7, 1981, 56-52198; Apr. 16, 1981, 56-57380; Jun. 10, 1981, 56-89390; Jun. 18, 1981, 56-94380

Int. Cl.³ C07C *69/76*

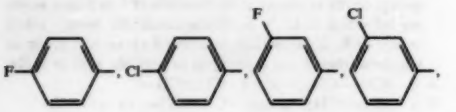
U.S. Cl. 560—107 **6 Claims**

1. A carboxylic acid cyclohexyl ester derivative expressed by the formula

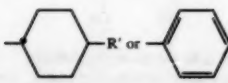


(I)

wherein A represents



B represents



R represents an alkyl group or an alkoxy group, both having 1 to 10 carbon atoms; and R′ represents an alkyl group having 1 to 10 carbon atoms.

4,487,955
PROCESS FOR PREPARING CIS OR TRANS, OPTICALLY ACTIVE MONOALKYL ESTERS OF CYCLOPROPANE-1,3-DICARBOXYLIC ACIDS

Alain Krief, Wepion, Belgium, assignor to Roussel Uclaf, Paris, France

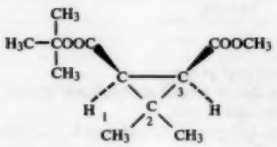
Continuation-in-part of Ser. No. 308,027, Oct. 2, 1981, abandoned, which is a continuation-in-part of Ser. No. 308,026, Oct. 2, 1981, Pat. No. 4,408,066. This application Jul. 6, 1983, Ser. No. 511,506

Int. Cl.³ C07C *69/74*

U.S. Cl. 560—124 **5 Claims**

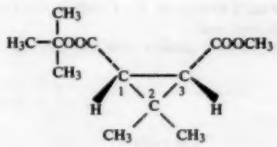
1. A process for the preparation of esters of 2,2-dimethylcyclopropane-1,3-dicarboxylic acids in their optically active forms having a cis or trans configuration comprising salifying the monomethyl ester of (1RS,3SR) cis 2,2-dimethyl-cyclopropane-1,3-dicarboxylic acid with d or l α-methyl-benzylamine, recovering the crystallized salt formed, dissolving the said salt in water, treating the solution with a mineral base and then with an acid to obtain either the monomethyl ester of (1R,3S) cis 2,2-dimethyl-cyclopropane-1,3-dicarboxylic acid I or its (1S,3R) cis isomer depending on whether d or l α-methyl-benzylamine, respectively was used and optionally reacting the latter cis compound with a strong base to isomerize the monomethyl ester to the monomethyl ester of (1S,3S) trans 2,2-dimethyl-cyclopropane-1,3-dicarboxylic acid I or (1R,3R) trans isomer.

3. A process for the preparation of esters of 2,2-dimethylcyclopropane-1,3-dicarboxylic acids in their optically active forms, having a cis or trans configuration I comprising salifying the monomethyl ester of (1RS,3SR) cis 2,2-dimethyl-cyclopropane-1,3-dicarboxylic acid with d or l α-methyl-benzylamine, recovering the crystallized salt formed, dissolving the said salt in water, treating the solution with a mineral base and then with an acid to obtain either the monomethyl ester of (1S,3S) cis 2,2-dimethyl-cyclopropane-1,3-dicarboxylic acid or its (1S,3R) cis isomer depending on whether d or l α-methyl-benzylamine, respectively was used, reacting the cis compound of (1R,3S) or (1S,3R) configuration with isobutene to obtain a compound of (1S,3R) configuration of the formula



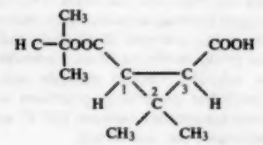
III_A

or a compound of (1R,3S) configuration of the formula



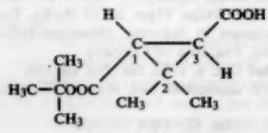
III_B

subjecting the said compound to selective hydrolysis to remove the methyl ester group to form a compound of the formula



I_A

of (1S,3S) cis or (1R,3S) cis configuration, respectively and optionally subjecting the compound of formula I_A to a strong isomerization base to obtain a compound of the formula



I_B

of (1R,3R) trans of (1S,3S) trans configuration.

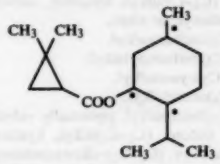
4,487,956

MENTHYL 2,2-DIMETHYLCYCLOPROPANECARBOXYLATE AND RESOLUTION OF THE SAME

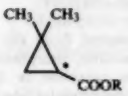
Gohfu Suzukamo, Ibaraki, and Yoji Sakito, Takarazuka, both of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Sep. 19, 1983, Ser. No. 533,635
Claims priority, application Japan, Jul. 20, 1983, 58-133043
Int. Cl.³ C07C *69/74*
U.S. Cl. 560—124 **8 Claims**

1. A method for producing optically active 2,2-dimethylcyclopropanecarboxylic acid and its derivative which comprises resolving an ester obtained from 2,2-dimethylcyclopropane-1-carboxylic acid and optically active menthol represented by the formula,

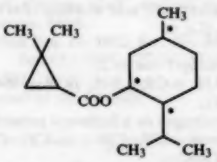


into the optical isomers by chromatography or fractional crystallization, and hydrolyzing the isomer obtained, if necessary, to obtain an optically active carboxylic acid or its optically active menthyl ester represented by the formula,



wherein R represents a hydrogen atom or an optically active menthyl group.

5. An ester obtained from 2,2-dimethylcyclopropane-1-carboxylic acid and optically active menthol represented by the formula,



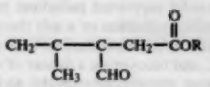
4,487,957

PROCESS FOR THE PREPARATION OF ALKYL 4-METHYL-3-FORMYL-PENTEN-1-OATES

Jacques Martel, Bondy; Jean Tessier, Vincennes, and Jean-Pierre Demoute, Montreuil-sous-Bois, all of France, assignors to Roussel Uclaf, Paris, France

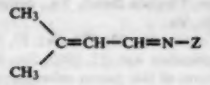
Division of Ser. No. 275,292, Jun. 19, 1981,. This application Apr. 21, 1983, Ser. No. 487,283
Claims priority, application France, Jun. 20, 1980, 80 13733
Int. Cl.³ C07C *69/73*
U.S. Cl. 560—177 **8 Claims**

1. A process for the preparation of an alkyl 4-methyl-3-formyl-penten-1-oate of the formula



I

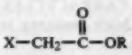
wherein R is alkyl of 1 to 5 carbon atoms and the dotted lines represent a double bond in the 3,4 or 4,5-position comprising reacting an unsaturated imino compound of the formula



II

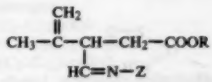
wherein Z is selected from the group consisting of alkyl of 1 to 6 carbon atoms, a hydrocarbon ring, monocyclic aryl and

and R_1 and R_2 are individually alkyl of 1 to 6 carbon atoms in a solvent in the presence of at least one strong base with an alkyl haloacetate of the formula



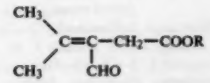
III

wherein X is a halogen and R is alkyl of 1 to 5 carbon atoms to obtain a compound of the formula



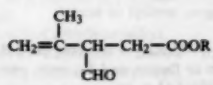
IV

and subjecting the latter to either (a) a double exchange with formaldehyde or (b) hydrolysis in an acid medium to obtain a compound of the formula



I_1

or a compound of the formula



I_2

or a mixture of the said compounds.

4,487,958

PROCESS FOR PREPARING A DIESTER OF OXALIC ACID

Bernard C. Ream, Charleston; Joseph P. Henry, S. Charleston, and Louis A. Kapicak, Charleston, all of W. Va., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Sep. 30, 1982, Ser. No. 428,816
Int. Cl.³ C07C *67/36*
U.S. Cl. 560—204 **15 Claims**

1. The vapor phase heterogeneous process for preparing a diester of oxalic acid which comprises contacting a vaporous

ester of nitrous acid with carbon monoxide in the vapor state, in the presence of a solid supported palladium monolith catalyst comprising metallic palladium or a salt thereof deposited on a monolithic carrier at a temperature of between about 50° C. and about 200° C., and recovering a diester of oxalic acid, in which the ester group corresponds to the alcohol used in making the ester of nitrous acid.

4,487,959

VINYL ACETATE PURIFICATION PROCESS

Richard C. Dickerson, Virginia Beach, Va., assignor to Ecolochem, Inc., Norfolk, Va.

Continuation-in-part of Ser. No. 201,373, Oct. 27, 1980, Pat. No. 4,379,940. This application Apr. 12, 1983, Ser. No. 484,386
The portion of the term of this patent subsequent to Apr. 12, 2000, has been disclaimed.
Int. Cl.[3] **C07C** *67/00, 67/56*
U.S. Cl. 560—248 **12 Claims**

1. A process for removing acetic acid contaminant from liquid vinyl acetate monomer comprising the following steps:
(a) providing a bed of anion exchange resin which has been dehydrated by azeotropic distillation; and
(b) passing said vinyl acetate monomer containing acetic acid through said anion exchange resin bed whereby said acetic acid contaminant is removed from said vinyl acetate monomer.

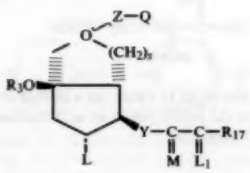
4,487,960

9-SUBSTITUTED CARBACYCLIN ANALOGS

Chiu-Hong Lin, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Apr. 19, 1982, Ser. No. 369,725
Int. Cl.[3] **C07C** *177/00, 57/26*
U.S. Cl. 560—256 **13 Claims**

1. A compound of the formula

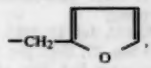


wherein D is

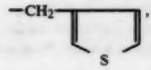
cis $\rangle C{=}CH-$, trans $\rangle C{=}CH-$ or $\rangle CHCH_2-$;

wherein R_3 is hydrogen, methyl or acetyl;
wherein Z is:
(1) $-CH_2-(CH_2)_f-C(R_4)_2-$ wherein each R_4 is the same and is hydrogen or fluoro, and f is zero, one, 2 or 3;
(2) trans-$CH_2-CH{=}CH-$; or
(3) $-(Ph)-(CH_2)_g-$ wherein Ph is 1,2-, 1,3-, or 1,4-phenylene and g is zero, one, 2 or 3;
wherein Q is
(1) $-COOR_5$, wherein R_5 is
(a) hydrogen,
(b) (C_1–C_{12})alkyl,
(c) (C_3–C_{10})cycloalkyl,
(d) (C_7–C_{12})aralkyl,
(e) phenyl optionally substituted with one, 2 or 3 chloro or (C_1–C_4)alkyl,
(f) phenyl substituted in the para-position with $-NHCOR_6$, $-COR_7$, $-OC(O)R_8$ or $-CH{=}N-NHCONH_2$, wherein R_6 is methyl, phenyl, acetamidophenyl, benzamidophenyl or $-NH_2$; R_7 is methyl, phenyl, $-NH_2$, or methoxy; and R_8 is phenyl or acetamidophenyl;
(g) phthalidyl,
(h) 3-(5,5-dimethyl-1,3,2-dioxaphosphorinan-2-yl)-2-oxopropan-1-yl P-oxide,
(i) 3-(5,5-di(hydroxymethyl)-1,3,2-dioxaphosphorinan-2-yl)-2-oxopropan-1-yl P-oxide, or
(j) a pharmacologically acceptable cation;
(2) $-CH_2OH$;
(3) $-COL_2$, wherein L_2 is
(a) an amino group of the formula $-NR_9R_{10}$ wherein R_9 is hydrogen or (C_1–C_{12})alkyl and R_{10} is
(i) hydrogen
(ii) (C_1–C_{12})alkyl
(iii) (C_3–C_{10})cycloalkyl,
(iv) (C_7–C_{12})aralkyl
(v) phenyl optionally substituted with one, 2 or 3 chloro, (C_1–C_3)alkyl, hydroxy, carboxy, (C_2–C_5)alkoxycarbonyl, or nitro,
(vi) (C_2–C_5)carboxyalkyl,
(vii) (C_2–C_5)carbamoylalkyl,
(viii) (C_2–C_5)cyanoalkyl,
(ix) (C_3–C_6)acetylalkyl,
(x) (C_7–C_{12})benzoalkyl, optionally substituted by one, 2, or 3 chloro, (C_1–C_3)alkyl, hydroxy, (C_1–C_3)alkoxy, carboxy, (C_2–C_5)-alkoxycarbonyl, or nitro,
(xi) pyridyl, optionally substituted by one, 2, or 3 chloro, (C_1–C_3)alkyl, or (C_1–C_3)alkoxy,
(xii) (C_6–C_9)pyridylalkyl optionally substituted by one, 2, or 3 chloro, (C_1–C_3)alkyl, hydroxy, or (C_1–C_3)alkyl,
(xiii) (C_1–C_4)hydroxyalkyl,
(xiv) (C_1–C_4)dihydroxyalkyl,
(xv) (C_1–C_4)trihydroxyalkyl;
(b) cycloamine selected from the group consisting of pyrolidino, piperidino, morpholino, piperazino, hexamethyleneimino, pyrroline, or 3,4-didehydropiperidinyl optionally substituted by one or 2 ($C_{1'}$-C_{12})alkyl;
(c) carbonylamino of the formula $-NR_{11}COR_{10}$, wherein R_{11} is hydrogen or (C_1–C_4)alkyl and R_{10} is other than hydrogen, but otherwise defined as above;
(d) sulfonylamino of the formula $-NR_{11}SO_2R_{10}$, wherein R_{11} and R_{10} are defined in (c);
(4) $-CH_2NL_3L_4$, wherein L_3 and L_4 are hydrogen or (C_1–C_4)alkyl, being the same or different, or the pharmacologically acceptable acid addition salts thereof when Q is $-CH_2NL_3L_4$; or
(5) $-CN$;
wherein s is the integer one or 2;
wherein L is H,H; α-OR_{12},β-H; βOR_{12}; α-CH_2OR_{12},β-H; α-H,β-CH_2OR_{12}
wherein R_{12} is hydrogen or a hydroxyl protecting group;
wherein Y is trans $-CH{=}CH-$, cis-$CH{=}CH-$, $-CH_2CH_2-$, or $-C{\equiv}C-$;
wherein M is α-OR_{12},β-R_{14}; or α-R_{14},β-OR_{12}, wherein R_{12} is as defined above, and R_{14} is hydrogen or methyl;
wherein L_1 is α-R_{15},β-R_{16}; α-R_{16},β-R_{15}; or a mixture thereof wherein R_{15} and R_{16} are hydrogen, methyl, or fluoro being the same or different with the proviso that one of R_{15} and R_{16} is fluoro only when the other of R_{15} and R_{16} is hydrogen or fluoro;
wherein R_{17} is (1) $-C_mH_{2m}CH_3$ wherein m is an integer of from one to 5,
(2) phenoxy optionally substituted by one, 2, or 3 chloro, fluoro, trifluoromethyl, (C_1–C_3)alkyl, or (C_1–C_3)alkoxy, with the proviso that not more than two substituents are other than alkyl and with the proviso that R_{17} is phenoxy or substituted phenoxy, only when R_{15} and R_{16} are hydrogen or methyl, being the same or different;
(3) phenyl, benzyl, phenylethyl, or phenylpropyl optionally substituted on the aromatic ring by one, 2, or 3 chloro, fluoro, trifluoromethyl (C_1–C_3)alkyl, or (C_1–C_3)alkoxy, with the proviso that not more than two substituents are other than alkyl,

(4) cis-CH=CH—CH_2CH_3,
(5) —$(CH_2)_2$—CH(OH)—CH_3,
(6) —$(CH_2)_3$—CH=$C(CH_3)_2$,
(7)

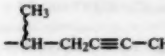


or
(8)



or
wherein

taken together is
(1) (C_4–C_7)cycloalkyl optionally substituted by one to 3 (C_1–C_5)-alkyl,
(2) 3-thienyloxymethyl,
(3)



(4) —C≡C—$C_qH_{2q}CH_3$ wherein q is an integer of from 2 to 6, or
(5) —C_pH_{2p}CH=CH_2 wherein p is an integer of from 3 to 7; and individual optical isomers thereof.

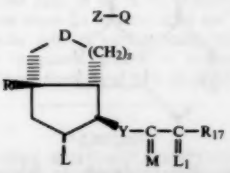
4,487,961

9-SUBSTITUTED CARBACYCLIN ANALOGS

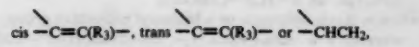
Paul A. Aristoff, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Feb. 16, 1982, Ser. No. 349,145
Int. Cl.³ C07C *177/00, 57/26*
U.S. Cl. 562—501 **14 Claims**

1. A compound of the formula



wherein R is —CN; —CH_2X wherein X is chloro or bromo; —CH=CH_2; —CHO; —CH_2OH; —C≡CH; —C≡C—CF_3; —C≡C—$C_nH_{2n}CH_3$ wherein n is zero, one, 2 or 3; cis-CH=$CHC_nH_{2n}CH_3$ or trans-CH=$CHC_nH_{2n}CH_3$ wherein n is zero, one, 2 or 3; —CH=C(X')$_2$ wherein X' is fluoro, chloro, or bromo; cis-CH=CHX' or trans-CH=CHX' wherein X' is fluoro, chloro, or bromo; —C≡C—C≡CR_1
wherein R_1 is hydrogen, methyl, or ethyl; —C≡COR_2 wherein R_2 is methyl or ethyl;
wherein D is



wherein R_3 is hydrogen or fluoro;
wherein Z is:
(1) —CH_2—$(CH_2)_f$—$C(R_4)_2$— wherein each R_4 is the same and is hydrogen or fluoro, and f is zero, one, 2 or 3;
(2) trans-CH_2—CH=CH—; or
(3) —(Ph)—$(CH_2)_g$— wherein Ph is 1,2-, 1,3-, or 1,4-phenylene and g is zero, one, 2 or 3; with the proviso that when Z is —(Ph)—$(CH_2)_g$—, R_3 is hydrogen;
wherein Q is
(1) —$COOR_5$, wherein R_5 is
(a) hydrogen,
(b) (C_1–C_{12})alkyl,
(c) (C_3–C_{10})cycloalkyl,
(d) (C_7–C_{12})aralkyl,
(e) phenyl optionally substituted with one, 2 or 3 chloro or (C_1–C_4)alkyl,
(f) phenyl substituted in the para-position with —NH-COR_6, —COR_7, —OC(O)R_8 or —CH=N—NH-$CONH_2$, wherein R_6 is methyl, phenyl, acetamidophenyl, benzamidophenyl or —NH_2; R_7 is methyl, phenyl, —NH_2, or methoxy; and R_8 is phenyl or acetamidophenyl;
(g) phthalidyl,
(h) 3-(5,5-dimethyl-1,3,2-dioxaphosphorinan-2-yl)-2-oxopropan-1-yl P-oxide,
(i) 3-(5,5-di(hydroxymethyl)-1,3,2-dioxaphosphorinan-2-yl)-2-oxopropan-1-yl P-oxide, or
(j) a pharmacologically acceptable cation;
(2) —CH_2OH;
(3) —COL_2, wherein L_2 is
(a) an amino group of the formula —NR_9R_{10} wherein R_9 is hydrogen or (C_1–C_{12})alkyl and R_{10} is
(i) hydrogen
(ii) (C_1–C_{12})alkyl
(iii) (C_3–C_{10})cycloalkyl,
(iv) (C_7–C_{12})aralkyl
(v) phenyl optionally substituted with one, 2 or 3 chloro, (C_1–C_3)alkyl, hydroxy, carboxy, (C_2–C_5)alkoxycarbonyl, or nitro,
(vi) (C_2–C_5)carboxyalkyl,
(vii) (C_2–C_5)carbamoylalkyl,
(viii) (C_2–C_5)cyanoalkyl,
(ix) (C_3–C_6)acetylalkyl,
(x) (C_7–C_{12})benzoalkyl, optionally substituted by one, 2, or 3 chloro, (C_1–C_3)alkyl, hydroxy, (C_1–C_3)alkoxy, carboxy, (C_2–C_5)-alkoxycarbonyl, or nitro,
(ix) pyridyl, optionally substituted by one, 2, or 3 chloro, (C_1–C_3)alkyl, or (C_1–C_3)alkoxy,
(xii) (C_6–C_9)pyridylalkyl optionally substituted by one, 2, or 3 chloro, (C_1–C_3)alkyl, hydroxy, or (C_1–C_3)alkyl,
(xiii) (C_1–C_4)hydroxyalkyl,
(xiv) (C_1–C_4)dihydroxyalkyl,
(xv) (C_1–C_4)trihydroxyalkyl;
(b) cycloamine selected from the group consisting of pyrolidino, piperidino, morpholino, piperazino, hexamethyleneimino, pyrroline, or 3,4-didehydropiperidinyl optionally substituted by one or 2 (C_1–C_{12})alkyl;
(c) carbonylamino of the formula —$NR_{11}COR_{10}$, wherein R_{11} is hydrogen or (C_1–C_4)alkyl and R_{10} is other than hydrogen, but otherwise defined as above;
(d) sulfonylamino of the formula —$NR_{11}SO_2R_{10}$, wherein R_{11} and R_{10} are defined in (c);
(4) —$CH_2NL_3L_4$, wherein L_3 and L_4 are hydrogen or (C_1–C_4)alkyl, being the same or different, or the pharmacologically acceptable acid addition salts thereof when Q is —$CH_2NL_3L_4$; or
(5) —CN;
wherein s is the integer one or 2;

wherein L is H,H; α—OR_{12},β—H; α—H,β—OR_{12}; α—CH_2OR_{12},β—H; α—H,β—CH_2OR_{12}

wherein R_{12} is hydrogen or a hydroxyl protective group;

wherein Y is trans-CH=CH—, cis-CH=CH—, —CH_2CH_2—, or —C≡C—;

wherein M is α—OR_{12},β—R_{14}; or α—R_{14},β—OR_{12}, wherein R_{12} is as defined above, and R_{14} is hydrogen or methyl;

wherein L_1 is α—R_{15},β—R_{16}; α—R_{16},β—R_{15}; or a mixture thereof

wherein R_{15} and R_{16} are hydrogen, methyl, or fluoro being the same or different with the proviso that one of R_{15} and R_{16} is fluoro only when the other of R_{15} and R_{16} is hydrogen or fluoro;

wherein R_{17} is

(1) $—C_mH_{2m}CH_3$ wherein m is an integer of from one to 5,

(2) phenoxy optionally substituted by one, 2, or 3 chloro, fluoro, trifluoromethyl, (C_1–C_3)alkyl, or (C_1–C_3)alkoxy, with the proviso that not more than two substituents are other than alkyl and with the proviso that R_{17} is phenoxy or substituted phenoxy, only when R_{15} and R_{16} are hydrogen or methyl, being the same or different;

(3) phenyl, benzyl, phenylethyl, or phenylpropyl optionally substituted on the aromatic ring by one, 2, or 3 chloro, fluoro, trifluoromethyl (C_1–C_3)alkyl, or (C_1–C_3)alkoxy, with the proviso that not more than two substituents are other than alkyl,

(4) cis-CH=CH—CH_2CH_3,

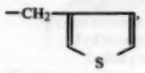
(5) —$(CH_2)_2$—CH(OH)—CH_3,

(6) —$(CH_2)_3$—CH=$C(CH_3)_2$,

(7)

or

(8)



or

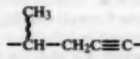
wherein

taken together is

(1) (C_4–C_7)cycloalkyl optionally substituted by one to 3 (C_1–C_5)alkyl,

(2) 3-thienyloxymethyl,

(3)



(4) —C≡C—$C_qH_{2q}CH_3$ wherein q is an integer of from 2 to 6, or

(5) —C_pH_{2p}CH=CH_2 wherein p is an integer of from 3 to 7; and individual optical isomers thereof.

4,487,962

PREPARATION OF METHACRYLIC ACID BY GAS PHASE OXIDATION OF METHACROLEIN

Richard Krabetz, Kirchheim; Franz Merger, Frankenthal, and Matthias Schwarzmann, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 283,633, Jul. 15, 1981, Pat. No. 4,409,128. This application Sep. 27, 1982, Ser. No. 424,553

Claims priority, application Fed. Rep. of Germany, Aug. 9, 1980, 3030243

Int. Cl.[3] **C07C** *51/25, 57/055*

U.S. Cl. 562—534 **1 Claim**

1. A process for the preparation of methacrylic acid by gas phase oxidation of methacrolein with a gas mixture containing oxygen and steam over an oxidation catalyst wherein the catalytically active component has the formula

$$Mo_{12}P_aRh_bCu_cV_dCs_eX_fY_gZ_hO_x$$

where X is Cr and/or Fe; Y is Nb; Z is Na, Li, K and/or Rb; a is 0.1–4; b is 0.001–1; c is 0.05–2; d is 0.05–4; e is 0.1–5; f is 0–2; g is 0–3; h is 0–2; and x is the number of oxygen atoms required to saturate the valencies of the other constituents.

4,487,963

ENANTIOSELECTIVE SYNTHESIS OF 4-AMINO-3-HYDROXY-2,4-(DISUBSTITUTED)PENTANOIC ACID

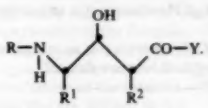
Mark G. Bock, Hatfield, and Robert M. DiPardo, Lansdale, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jan. 3, 1983, Ser. No. 455,100

Int. Cl.[3] **C07C** *101/30*

U.S. Cl. 562—567 **1 Claim**

1. A method of preparing a compound of the formula:



(I)

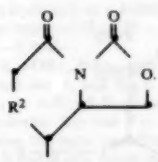
wherein:

R is hydrogen;

R^1 and R^2 are methyl and

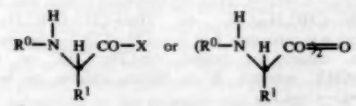
Y is OH; and the configuration of the compound is (2S, 3S, 4R) comprising the following steps;

(a) treating an N-acyloxazolidinone of the formula:



(II)

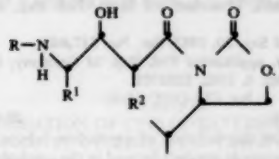
with lithium diisoprorylamide or lithium hexamethyl disilazide, followed by reaction with a compound of the formula:



where X is a leaving group selected from Cl, Br, or pentafluorophenoxy, dinitrophenoxy and R^0 is t-butyloxycarbo-

nyl or benzyloxycarbonyl; and the compound has a D-configuration;

(b) reducing the product of Step (a) with zinc borohydride to form the compound of the formula:



(IV)

having a (2S, 3S, 4R) configuration; and

(c) treating the product of Step (b) with potassium hydroxide to give a compound of Formula I having a (2S, 3S, 4R) configuration.

4,487,964

METHOD OF MAKING MIXED ALIPHATIC/AROMATIC POLYCARBODIIMIDES

Stuart L. Watson, Jr., South Charleston, and Gordon R. Humphreys, Clendenin, both of W. Va., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Feb. 24, 1983, Ser. No. 469,434

Int. Cl.³ C07C *119/055*

U.S. Cl. 564—252 **9 Claims**

1. Method of preparing mixed aliphatic and aromatic polycarbodiimides which comprises the following steps seriatim:

(A) charging a mixture of cycloaliphatic or saturated aliphatic mono- and diisocyanates to a reactor with agitation under an inert atmosphere;

(B) heating the resultant mixture to about 120° to about 160° C.;

(C) adding a catalytic amount of a phospholene oxide catalyst to the reactor;

(D) feeding a mixture of a non-reactive solvent and aromatic mono- and/or diisocyanate to the reactor; and

(E) maintaining agitation at about 120° to about 160° C. until all of the isocyanate functionality is converted to carbodiimide functionality, with the provisos that:

(a) said cycloaliphatic moieties contain 6 to about 10 carbons;

(b) said saturated aliphatic moieties contain from about 4 to about 12 carbons;

(c) said aromatic moieties contain from 6 to about 16 carbons;

(d) The molar ratio of all of the mono-to-diisocyanates range from about 2:1 to about 2:10; and

(e) The molar ratio of cycloaliphatic and/or saturated aliphatic isocyanate groups to aromatic isocyanate groups ranges from about 0.5:1 to about 2:1.

4,487,965

TRANS-3-(4'-TERT.-BUTYLCYCLOHEX-1'YL)-2-METHYL-1-DIALKYLAMINOPROPANES, THEIR PREPARATION AND THEIR USE AS DRUGS

Walter Himmele, Walldorf; Wolfgang Heberle, Starnberg; Friedrich-Wilhelm Kohlmann, Moorrege, and Walter Wesenberg, Bujendorf ueber Eutin, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

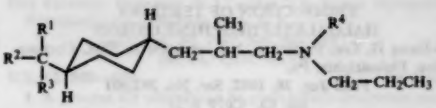
Filed Jun. 27, 1983, Ser. No. 508,143

Claims priority, application Fed. Rep. of Germany, Jul. 10, 1982, 3225879

Int. Cl.³ C07C *85/24, 87/36*

U.S. Cl. 564—454 **5 Claims**

1. A trans-3-(4'-tert.-butylcyclohex-1'-yl)-2-methyl-1-dialkylaminopropane of the formula I



(I)

where R^1, R^2 and R^3 are identical or different and are each C_1–C_4-alkyl, or two of the radicals R^1, R^2 and R^3 together can form a cyclopentyl or cyclohexyl radical, and R^4 is ethyl or n-propyl, and its salts with physiologically tolerated acids.

4,487,966

3-AMINOMETHYL-1-(3-AMINOPROPYL-1-METHYL)-4-METHYLCYCLOHEXANE, A PROCESS FOR ITS PREPARATION AND ITS USE

Paul Fiedler, Cologne, and Rudolf Braden, Odenthal, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 15, 1983, Ser. No. 514,376

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1982, 3228719

Int. Cl.³ C07C *87/34, 87/36*

U.S. Cl. 564—454 **1 Claim**

1. 3-Aminomethyl-1-(3-aminopropyl-1-methyl)-4-methylcyclohexane.

4,487,967

PROCESS FOR PREPARING SECONDARY AMINOETHER ALCOHOLS

Eugene L. Stogryn, Edison; W. S. Winston Ho, Annandale; Angelo A. Montagna, Summit, and Guido Sartori, Linden, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Dec. 23, 1983, Ser. No. 565,097

Int. Cl.³ C07C *85/00, 85/02*

U.S. Cl. 564—474 **10 Claims**

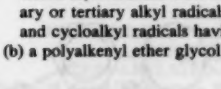
1. A process for selectively producing a severely sterically hindered secondary aminoether alcohol comprising reacting:

(a) a primary amino compound having the general formula

$$R_1—NH_2$$

where R_1 is selected from the group consisting of secondary or tertiary alkyl radicals having 3 to 8 carbon atoms and cycloalkyl radicals having 3 to 8 carbon atoms, with

(b) a polyalkenyl ether glycol having the general formula:



where R_2, R_3, R_4 and R_5 are each independently selected from the group consisting of hydrogen, C_1 to C_4 alkyl radicals, and C_3–C_8 cycloalkyl radicals, with the proviso that if the carbon atom of R_1 directly attached to the nitrogen atom is secondary, at least one of R_2 and R_3 directly bonded to the carbon which is bonded to the hydroxyl group is an alkyl or cycloalkyl radical, x and y are each positive integers independently ranging from 2 to 4, and z is a positive integer ranging from 1 to 4, said process being carried out in the presence of a catalytically effective amont of a Group VIII metal containing supported hydrogenation catalyst at elevated temperatures and pressures, and wherein the mole ratio of amino compound to polyalkenyl ether glycol is less than 2:1 when z is greater than 1.

4,487,968

PRODUCTION OF TERTIARY HALOALKYLPHOSPHINE OXIDES

Fui-Tseng H. Lee, Princeton, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed Jun. 28, 1982, Ser. No. 392,901
Int. Cl.³ C07F 9/53
U.S. Cl. 568—14 10 Claims

1. A process of producing a tertiary haloalkylphosphine oxide comprising reacting under acidic conditions a tertiary phosphine having at least one hydroxyalkyl group attached to the phosphorus atom, with a hydrogen halide selected from the class consisting of hydrogen chloride and hydrogen bromide whereby the hydroxy is replaced with halide to form the corresponding tertiary haloalkylphosphine and elimination of water which under the said acidic conditions reacts with the tertiary haloalkylphosphine to give the tertiary haloalkylphosphine oxide aforesaid.

4,487,969

PRODUCTION OF M-FLUOROACETOPHENONE

Max M. Boudakian, Pittsford, N.Y., assignor to Olin Corporation, Cheshire, Conn.

Filed Sep. 30, 1982, Ser. No. 429,762
Int. Cl.³ C07C 49/303
U.S. Cl. 568—316 6 Claims

1. A process for the production of m-fluoroacetophenone which comprises reacting m-aminoacetophenone with a diazotization agent and hydrogen fluoride to produce a corresponding diazonium fluoride; and decomposing the diazonium fluoride to produce m-fluoroacetophenone.

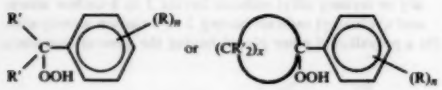
4,487,970

CLEAVAGE OF HYDROPEROXIDES

Charles A. Drake, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

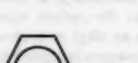
Filed Jun. 3, 1983, Ser. No. 500,679
Int. Cl.³ C07C 45/53
U.S. Cl. 568—342 11 Claims

1. An improved process for the cleavage of a secondary-alkyl substituted benzene hydroperoxide of the formula:



wherein R is a C_1–C_{20} alkyl, cycloalkyl, or alkaryl radical, R′ is independently a C_1 to C_{10} alkyl, aryl, or alkaryl radical, n is an integer from 0–5, and x is an integer from 2 to 11, comprising contacting said hydroperoxide with a catalyst consisting essentially of about 3:1 to 1:10 by weight of SbF_5 and graphite in the presence of a solvent selected from the group consisting of

(a) an aromatic hydrocarbon of the formula



wherein R″ is a C_1 to C_8 hydrocarbyl radical and m is an integer from 0–6; or

(b) a C_1 to C_{10} ketone;

at a temperature of from about 0°–100° C.

4,487,971

PROCESS FOR THE ISOLATION OF CRYSTALLINE 1,3-CYLOHEXANEDIONE

Heinz Litterer, Wiesbaden, and Helmut Meidert, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 30, 1983, Ser. No. 537,648
Claims priority, application Fed. Rep. of Germany, Oct. 4, 1982, 3236700; Oct. 4, 1982, 3236701
Int. Cl.³ C07C 45/81
U.S. Cl. 568—366 20 Claims

1. A process for the isolation of crystalline 1,3-cyclohexanedione from the crude product formed in the catalytic gaseous phase cyclization of 5-oxohexanoic acid, which comprises adding to the crude product before or directly after condensation from to 20 to 200 weight %, relative to the crude product, of an auxiliary component consisting of at least one compound selected from the group consisting of cyclic hydrocarbons, chlorinated aliphatic hydrocarbons and monoethers; distilling then the mixture of crude product and auxiliary component at 0° to 80° C. under normal or reduced pressure until the water of reaction is removed and the content of auxiliary component in the remaining concentrate is from 5 to 50 weight %; and filtering off the precipitated crystalline 1,3-cyclohexanedione.

4,487,972

PRODUCTION OF OXYGENATED COMPOUNDS

Werner O. Haag, Lawrenceville, and Darrell D. Whitehurst, Titusville, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 815,872, Jul. 14, 1977, abandoned, which is a division of Ser. No. 107,863, Jan. 19, 1971, Pat. No. 4,098,727, which is a continuation-in-part of Ser. No. 57,796, Jul. 23, 1970, abandoned, and a continuation-in-part of Ser. No. 860,807, Sep. 24, 1969, abandoned, and Ser. No. 672,009, Oct. 2, 1967, , said Ser. No. 860,807, is a continuation-in-part of Ser. No. 672,010, Oct. 2, 1967, , said Ser. No. 57,796, is a continuation-in-part of Ser. No. 672,008, Oct. 2, 1967, abandoned. This application Apr. 22, 1980, Ser. No. 142,788
Claims priority, application United Kingdom, Sep. 26, 1968, 45771/68
Int. Cl.³ C07C 45/50, 29/16
U.S. Cl. 568—444 7 Claims

1. A process for the production of an oxygenated compound selected from the group consisting of aldehydes and alcohols comprising hydroformylating an olefin with carbon monoxide and hydrogen under hydroformylating conditions at a temperature up to about 250° C. and with a catalyst consisting essentially of an insoluble organic polymer containing a functional group selected from the group consisting of amine, thiol, phosphine and arsine groups having chemically bonded thereto a metal selected from the group consisting of cobalt and rhodium.

4,487,973

HYDROFORMYLATION PROCESS WITH PLATINUM (O) CATALYST

Chao-Yang Hsu, Media, and Paul E. Ellis, Jr., Downingtown, both of Pa., assignors to Sun Tech, Inc., Philadelphia, Pa.

Filed May 5, 1983, Ser. No. 491,687
Int. Cl.³ C07C 45/50
U.S. Cl. 568—454 10 Claims

1. In a hydroformylation process for preparing aldehydes by reactively contacting, at elevated temperature and pressure, an olefin, hydrogen and carbon monoxide in the presence of a catalyst, the improvement which comprises using as the catalyst a mixture of a platinum complex of the formula:

$Pt(QR_3)_m$

where Q is a Group VA element, R is alkyl, alkoxyl, aryl or aryloxyl, and m is an integer of from 2 to 4,
and a metal halide co-catalyst of the formula:

$$MX_n$$

where M is a Group IV B Metal, X is a halogen, and n is 2 or 4.

4,487,974

OXIDATION OF CYCLOHEXYLBENZENE TO 1-PHENYL CYCLOHEXYLHYDROPEROXIDE

John R. Sanderson, Austin, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Feb. 24, 1983, Ser. No. 469,183
Int. Cl.³ C07C *179/02*
U.S. Cl. 568—570 **9 Claims**

1. A method of preparing 1-phenyl cyclohexylhydroperoxide comprising the step of contacting a mixture comprising cyclohexylbenzene, between about 0.01 and 1 percent by weight of an alkali or alkaline earth metal salt of cumene hydroperoxide, between about 0.005 and about 0.5 percent by weight of an alkali or alkaline earth metal salt of phenol or a substituted phenol with an oxygen containing gas under reaction conditions of a temperature between about 80° and 140° C. and a pressure of at least one atmosphere effective to form said 1-phenyl cyclohexylhydroperoxide.

4,487,975

ETHERIFICATION OF PHENOLS

Serge Ratton, La Verpilliere, France, assignor to Rhone-Poulenc Industries, Paris, France

Continuation-in-part of Ser. No. 247,372, Mar. 25, 1981, abandoned. This application Aug. 11, 1982, Ser. No. 407,059
Claims priority, application France, Mar. 31, 1980, 80 07628; Sep. 29, 1981, 81 18571
Int. Cl.³ C07C *41/16*
U.S. Cl. 568—587 **52 Claims**

1. A process for the monoetherification of a phenol, comprising selectively monoetherifying a phenolic hydroxyl group of a compound having the structural formula (I):

$$HO—Ar—(R)_n \quad (I)$$

wherein Ar is an aryl radical comprising a benzene ring, or a plurality of ortho-fused or ortho- and peri-fused benzene rings; the substituents R, which are identical or different, represent a hydroxyl group, a linear or branched chain alkyl radical having from 1 to 6 carbon atoms, a linear or branched chain alkenyl radical having from 2 to 6 carbon atoms, a phenyl radical, a phenyl radical substituted with one or more alkyl radicals each having 1 to 4 carbon atoms, a cycloalkyl radical containing 5 or 6 carbon atoms, a cycloalkyl radical containing 5 or 6 carbon atoms and substituted with one or more alkyl radicals each having 1 to 4 carbon atoms, a phenylalkyl radical in which the aliphatic chain contains 1 to 4 carbon atoms, a cycloalkyl-alkyl radical in which the cycloalkyl portion contains 5 or 6 carbon atoms and the aliphatic chain contains from 1 to 4 carbon atoms, a halogen atom, a nitro atom, an amine group, an aldehyde group or a nitrile group, at least one of the substituents R being a hydroxyl group; and n is a number ranging from 1 to 5; with an alkyl or alkenyl carboxylate, or admixture of compounds adapted to in situ form such carboxylate, in the presence of a catalytically effective amount of a salt of a carboxylic acid, the carboxylic acid salt catalyst being an alkali metal carboxylate, an ammonium carboxylate or an alkaline earth metal carboxylate.

4,487,976

ETHERIFICATION OF PHENOL

Dan Farcasiu, Princeton, N.J., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Aug. 30, 1982, Ser. No. 412,711
Int. Cl.³ C07C *41/09*
U.S. Cl. 568—630 **24 Claims**

1. A process for etherifying phenols which comprises reacting said phenols, at elevated temperature, with a reactant selected from the group consisting essentially of an alcohol, ether and mixtures thereof in the presence of an acid catalyst comprising a sulfated composite of an oxide of a transition metal selected from the group consisting essentially of W, Hf, Nb, Ta, Zr and mixtures thereof on a support comprising a relatively high surface area alumina for a time sufficient to convert at least a portion of said alcohol feed to its corresponding ether with said reactant.

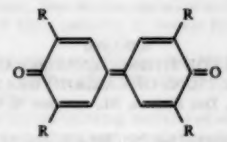
4,487,977

HIGH YIELD PROCESS FOR PREPARING 3,3',5,5'-TETRAALKYL-4,4'-BIPHENOL

Walter M. Kruse, Wilmington, Del., and John F. Stephen, West Chester, Pa., assignors to ICI Americas Inc., Wilmington, Del.

Filed Jul. 15, 1983, Ser. No. 514,255
Int. Cl.³ C07C *39/15*
U.S. Cl. 568—730 **8 Claims**

1. In the process of forming a tetraalkyl biphenol by the hydrogenation of a diphenoquinone having the following general formula:



wherein R is a tertiary alkyl group having 4 to 8 carbon atoms employing hydrogen gas at pressures ranging from atmospheric to 100 psi and 0.1–10% by weight of a heterogeneous catalyst selected from noble and transition metals the improvement comprising carrying out said reaction in an alkyl benzene solvent solution at temperatures ranging from 5°–10° C. below the boiling point of said solvent.

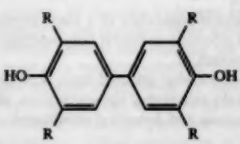
4,487,978

HIGH YIELD PROCESS FOR PREPARING 4,4'-BIPHENOL AND TERT-ALKYLATED-ALKYLBENZENES

Walter M. Kruse, Wilmington, Del., and John F. Stephen, West Chester, Pa., assignors to ICI Americas Inc., Wilmington, Del.

Filed Jul. 15, 1983, Ser. No. 514,256
Int. Cl.³ C07C *39/15*
U.S. Cl. 568—730 **7 Claims**

1. In the process of forming 4,4'-biphenol by the dealkylation of a tetraalkyl biphenol having the general formula:



wherein R is a tertiary alkyl group having 4 to 8 carbon atoms by heating at temperatures in the range of 100°–200° C. in the presence of a strong Lewis acid catalyst in an inert atmosphere

at pressures ranging from atmospheric to 100 psi the improvement which comprises carrying out said process in an alkyl benzene solvent solution wherein the mol ratio of alkyl benzene to biphenol is at least 4/1 and thereafter recovering biphenol and an R substituted alkyl benzene derivative.

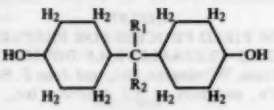
4,487,979

PURIFICATION

Roger G. Gaughan, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 18, 1983, Ser. No. 485,793
Int. Cl.³ C07C *35/21*
U.S. Cl. 568—816 **5 Claims**

1. A process for purifying crude bis(4-hydroxycyclohexyl) alkane having the formula



wherein R_1 and R_2 are independently selected from H, CH_3, C_2H_5, C_3H_7, C_4H_9, C_5H_{11}, said process comprising recrystallizing said bis(4-hydroxycyclohexyl) alkane from a solvent comprising at least one halogen-containing aliphatic or cycloaliphatic compound containing from about 1 to about 10 carbon atoms.

4,487,980

METHOD FOR HYDROGENATING AQUEOUS SOLUTIONS OF CARBOHYDRATES

Blaise J. Arena, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 340,614, Jan. 19, 1982, Pat. No. 4,382,150. This application Apr. 29, 1983, Ser. No. 489,925
Int. Cl.³ C07C *31/26*
U.S. Cl. 568—863 **11 Claims**

1. A method for the hydrogenation of a carbohydrate in aqueous solution to its polyols comprising contacting at hydrogenation conditions a reaction medium consisting essentially of said solution with hydrogen and a catalyst consisting essentially of from about 0.1% to about 25% of a zerovalent metal selected from the group consisting of ruthenium, palladium, and platinum dispersed on titanium dioxide, and recovering the formed polyols.

4,487,981

INHIBITING POLYMERIZATION OF VINYL AROMATIC MONOMERS

Richard F. Miller, Humble, and Michael P. Nicholson, Houston, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Sep. 8, 1983, Ser. No. 530,289
Int. Cl.³ C07C *7/18*
U.S. Cl. 585—4 **10 Claims**

1. A composition comprised of a vinyl aromatic compound and an amount effective to inhibit polymerization of said vinyl aromatic compound of

(1) at least one member selected from N,N' dimers of phenothiazine, halo-substituted phenothiazines, alkyl-substituted phenothiazines and haloalkyl-substituted phenothiazines, and

(2) at least one mono- or ditertiary alkyl dihydroxybenzene compound selected from tertiary alkylcatechols, ditertiary alkylcatechols, tertiary alkylhydroquinones, ditertiary alkylhydroquinones and mixtures of these.

4,487,982

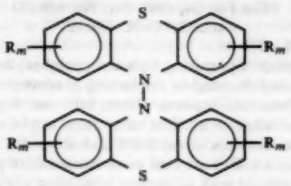
INHIBITING POLYMERIZATION OF VINYL AROMATIC MONOMERS

Richard F. Miller, Humble, and Michael P. Nicholson, Houston, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Sep. 8, 1983, Ser. No. 530,443
Int. Cl.³ C07C *7/18*
U.S. Cl. 585—4 **10 Claims**

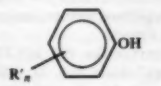
7. In a method of inhibiting polymerization of a vinyl aromatic compound comprising adding to the vinyl aromatic compound an amount of a polymerization inhibiting agent effective to substantially reduce the rate of polymerization, the improvement comprising using as the agent a combination of:

(1) at least one compound having the structural formula



wherein the R's may be the same substituent or different substituents selected from alkyl groups having 1 to 20 carbon atoms, halogen atoms, halogen-substituted alkyl groups having 1 to 20 carbon atoms and mixtures of these and the m's may be the same integer or different integers in the range of 0 to 4, and

(2) at least one compound having the structural formula



wherein R' is a an alkyl group having a total of 1 to 20 carbon atoms and n is an integer having a value of 1 or 2.

4,487,983

PROCESS FOR REACTING AROMATIC COMPOUNDS

Jeffrey T. Miller, and Thomas D. Nevitt, both of Naperville, Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Sep. 28, 1983, Ser. No. 536,672
Int. Cl.³ C07C *2/86*
U.S. Cl. 585—454 **22 Claims**

1. A method for reacting an aromatic compound, hydrogen and at least one of carbon monoxide and an alcohol containing from 1 to 6 carbon atoms, at a temperature in the range of from about 300° C. to about 480° C., at a pressure in the range of from about 5 to about 150 kilograms per square centimeter, and in the presence of a catalyst composition comprising a cadmium component and a support material having acidic properties, wherein the cadmium component is in the form of the elemental metal, its oxide or salt or a combination thereof, and wherein the cadmium component is present at a concentration level in the range of from about 0.1 to about 20 weight percent, calculated as cadmium oxide and based on the weight of the catalyst.

4,487,984

SYNTHESIS OF ALKYLAROMATIC COMPOUNDS

Tamotsu Imai, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Feb. 28, 1984, Ser. No. 584,375
Int. Cl.³ C07C *1/00*
U.S. Cl. 585—454 **16 Claims**

1. A process for the synthesis of an alkylaromatic compound

which comprises reacting an aromatic compound with a mixture of hydrogen and carbon monoxide at reaction conditions in the presence of a catalyst system comprising (1) a composite of oxides of copper, zinc and aluminum or chromium and (2) an aluminosilicate, and recovering the resultant alkylaromatic compound.

4,487,985

CATALYTIC CONVERSION WITH CATALYST REGENERATION SEQUENCE

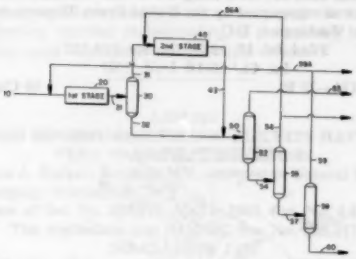
Samuel A. Tabak, Wenonah, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 26, 1983, Ser. No. 526,852

The portion of the term of this patent subsequent to Feb. 21, 2001, has been disclaimed.

Int. Cl.³ C07C *2/02*

U.S. Cl. 585—517 **8 Claims**



1. In the continuous process for converting an olefinic feedstock containing ethylene and C_3+ olefins by catalytic oligomerization to produce heavier hydrocarbons in the gasoline or distillate boiling range including the steps of:

(a) contacting the olefinic feedstock in a first catalyst stage comprising a plurality of serially connected fixed bed reactors with crystalline zeolite oligomerization catalyst at moderate temperature under conditions favorable for conversion of C_3+ olefins to a first reactor effluent stream rich in distillate range hydrocarbons;

(b) separating the first reactor effluent stream into a first stream rich in distillate and a second stream rich in ethylene;

(c) contacting the ethylene-rich stream from step (b) in a second catalytic stage comprising at least one fixed bed reactor with said crystalline zeolite oligomerization catalyst at substantially higher temperature than under conditions favorable for conversion of ethylene and other lower olefins to a second reactor effluent stream rich in olefinic gasoline range hydrocarbons; the improvement which comprises:

a cyclic fluid handing technique to connect the first stage serial reactors in operative fluid flow relationship whereby fresh or regenerated catalyst in a terminal reactor stage position receives effluent from a least one preceding first stage reactor operating at moderate temperature, said preceding first stage reactor containing catalyst of less activity than said catalyst in the terminal reactor stage position;

sequencing process flow to connect said preceding first stage reactor in said second stage to receive said ethylene-rich stream; increasing temperature in said previously preceding first stage reactor to second stage temperature conditions;

removing a second stage reactor containing inactivated catalyst from conversion service;

connecting said inactivated catalyst in fluid flow relationship with a catalyst regeneration loop;

regenerating said catalyst in situ;

advancing the terminal reactor of the first stage to a preceding serial position in the first stage; and

adding a fresh or regenerated catalyst reactor in the first stage terminal position.

4,487,986

OLEFIN DISPROPORTIONATION AND CATALYST THEREFORE

Semyon Kukes, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 9, 1980, Ser. No. 195,699

Int. Cl.³ C07C *6/00*

U.S. Cl. 585—645 **7 Claims**

1. A process for the disproportionation of olefins comprising contacting at least two non-conjugated olefinic reactants under suitable reaction conditions with a catalytic amount of a catalyst composition produced by admixing an inorganic refractory oxide containing a catalytic amount of at least one metal oxide selected from molybdenum oxide or tungsten oxide with a promoting amount of a dithionite salt of the formula $Me_xS_2O_4$ wherein Me is a metal selected from Groups IA and IIB of the Periodic Table of the Elements and x is an integer sufficient to satisfy the valence requirements.

4,487,987

METHOD OF DECOLORIZING MIXTURES OF AMINOETHYLPIPERAZINE, A POLYOXYPROPYLENEDIAMINE AND ALKYLPHENOLS WITH N,N-DIETHYLHYDROXYLAMINE

James H. Paslean, Port Neches, and Charles S. Steele, Nederland, both of Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Jun. 9, 1983, Ser. No. 502,881

Int. Cl.³ C07C *37/68*

U.S. Cl. 568—756 **4 Claims**

1. A method for decolorizing mixtures of aminoethylpiperazine, a polyoxypropylenediamine and alkylphenols comprising adding from 20 to 500 ppm by weight of N,N-diethylhydroxylamine to the mixture of aminoethylpiperazine, polyoxypropylenediamine and alkylphenol, where the alkylphenol has from 4 to 20 carbon atoms in the alkyl substituent.

4,487,988

NITRATION OF ORGANIC COMPOUNDS

Ian M. Campbell; Donald L. Baulch, both of Leeds, and Jonathan M. Chappel, Spalding, all of England, assignors to Interox Chemicals Limited, England

Filed Apr. 28, 1983, Ser. No. 489,466

Claims priority, application United Kingdom, Sep. 21, 1982, 8226938

Int. Cl.³ C07C *76/02*

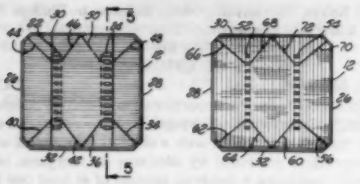
U.S. Cl. 568—943 **13 Claims**

1. In a process for the production of one or more organic nitro-compounds, organic nitrates or organic nitrites comprising reacting, in the vapour phase one or more organic compounds with a nitrating agent, and recovering at least one resulting organic nitro-compound, organic nitrate or organic nitrite from the residual vapour phase, the improvement wherein radicals of the one or more organic compounds are produced for nitration by reacting hydrogen peroxide vapour and nitrogen dioxide in the presence of an acidic solid surface to produce hydroxyl radicals and reacting the hydroxyl racicals with a vapour of a reactive substrate mainly comprising the one or more organic compounds by forming a mixture containing the hydroxyl radicals and the vapour of the reactive substrate or containing hydrogen peroxide vapour and nitrogen dioxide, as hydroxyl radical precursors, in the presence of the solid surface, and the vapour of the reactive substrate whereby the radicals so produced are contacted with the nitrating agent, an additive comprising molecular oxygen being present in said vapour phase.

4,487,989
CONTACT FOR SOLAR CELL

G. Felix Wakefield, Woodland Hills; James C. Arnett, La Canada, and Henry I. Yoo, Agoura, all of Calif., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jul. 25, 1983, Ser. No. 517,184
Int. Cl.³ H01L 31/04
U.S. Cl. 136—256 34 Claims

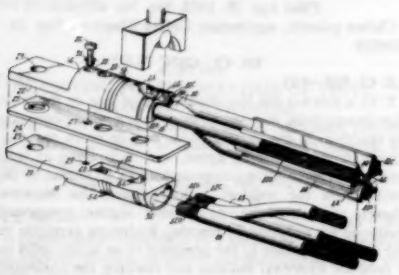


1. A solar cell comprising:
a semiconductor body to receive solar radiation and convert said radiation to electrical energy, said body having a first pair of opposed substantially parallel sides and a second pair of opposed substantially parallel sides, substantially perpendicular to said first pair of sides;
a front electrical contact for said body; and
a rear electrical contact for said body forming an intersecting pattern including a plurality of rows of solder pads substantially parallel to said first pair of sides, a first set of strips substantially parallel to said first pair of sides, a second set of strips substantially parallel to said second pair of sides, a third set of strips angularly oriented with respect to said first and second pairs of sides and a fourth set of strips substantially parallel to said first pair of sides, each strip of said fourth set of strips extending in the immediate vicinity of at least the two pads of a said row of pads closest to a side of said second pair of sides.

4,487,990
SIMPLIFIED WATER-COOLED WELDING CABLE TERMINAL

Charles H. Lane, Birmingham, Mich., and James K. Whittington, Mitchell, Ind., assignors to Essex Group, Inc., Fort Wayne, Ind.

Filed Nov. 17, 1983, Ser. No. 552,899
Int. Cl.³ H01B 7/34
U.S. Cl. 174—15 WF 9 Claims

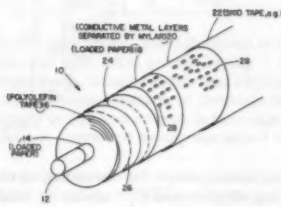


1. A dual polarity terminal for a cable having a plurality of electrical conductors and an internal passageway for receiving a cooling fluid comprising two half terminals each having a body which is shaped as an elongated half cylinder with a semicircular sidewall, a flat inner surface and an end face, an insulator sized to be positioned between said flat inner surfaces for providing electrical isolation between said two half terminals, each of said half terminals also including a socket integrally formed in said end face for receiving a plurality of electrical conductors of the same polarity, each of said half terminals also including a first port located near a mid-portion thereof and a second port located near a rear portion of the terminal, an axially-extending passageway formed in said flat inner surface of each of said half terminals communicating with said first and second port, each of said half terminals also including a depressed chordal section formed by mechanically welding said electrical conductors in said semicircular sidewall adjacent said socket which, in conjunction with said second port, said axially-extending passagway and said first port, form a passageway for allowing cooling fluid to flow through each of said half terminals to the internal passageway of said cable.

4,487,991
FULLY SYNTHETIC TAPED INSULATION CABLES

Eric B. Forsyth, Brookhaven, and Albert C. Muller, Center Moriches, both of N.Y., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 15, 1983, Ser. No. 514,127
Int. Cl.³ H01B 3/18, 7/02
U.S. Cl. 174—25 R 18 Claims

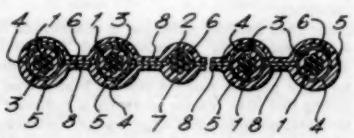


1. A high voltage power cable comprising multiple layers, one on top of another without paper between them, of biaxially oriented embossed polymer tape insulation over a conductor and impregnated with high dielectric strength insulating oil.

4,487,992
SHIELDED ELECTRICAL CABLE

Akira Tomita, Yamato, Japan, assignor to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 8, 1983, Ser. No. 530,310
Claims priority, application United Kingdom, Sep. 11, 1982, 8225990
Int. Cl.³ H01B 11/20, 7/08
U.S. Cl. 174—36 3 Claims



1. A shielded electrical cable, comprising:
a plurality of coaxial cables, each of the coaxial cables including a signal conductor, an insulating sheath surrounding the signal conductor and an outer conductor surrounding the insulation sheath;
a ground conductor extending in the same direction as said coaxial cables with the coaxial cables and the ground conductor being disposed in a substantially planar array;
an outer layer of insulating material covering the coaxial cables and the ground conductor thereby maintaining the

coaxial cables and the ground conductor in ribbon form and defining web means between the respective coaxial cables and the ground conductor so that the coaxial cables and the ground conductor remain parallel and spaced with respect to one another;

electrical conductive means disposed within the outer layer of insulating material, electrically engaging respective outer conductors of the coaxial cables therealong, extending through the web means and electrically engaging the ground conductor thereby electrically connecting all of the outer conductors of said coaxial cables to said ground conductor; and

the diameter of the outer layer of insulating material surrounding the ground conductor being substantially the same as the insulation sheath surrounding each signal conductor so that exposed insulation sheaths containing the signal conductors therein and the insulated ground conductor can be mass terminated in terminating sections of electrical terminals positioned at spaced intervals in a housing member corresponding to the spacing between the signal conductors and ground conductor.

4,487,993

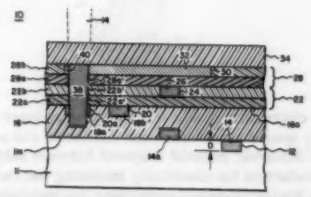
HIGH DENSITY ELECTRONIC CIRCUITS HAVING VERY NARROW CONDUCTORS

Charles A. Becker, Rexford, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 249,599, Apr. 1, 1981, Pat. No. 4,417,393. This application Aug. 15, 1983, Ser. No. 523,317

Int. Cl.³ H05K *1/03*

U.S. Cl. 174—68.5 **34 Claims**



1. A conductive circuit for interconnecting a plurality of locations, comprising:

a single substrate of insulative material having a first surface;

at least one channel formed through said first surface and into said substrate;

conductive material filling said at least one channel;

a layer of insulative material, positioned directly upon said substrate first surface and the adjacent surface of the conductive material filling said at least one channel, and comprising a first solid sublayer, closest to, and formed directly upon, said substrate, of an insulative and relatively non-laser-machineable material; and a second solid sublayer, formed directly upon a surface of said first sublayer furthest from said substrate, of an insulative and relatively laser-machineable material;

at least one other channel formed by laser-machining at least partially through the thickness of only said second sublayer; and

conductive material filling said at least one other channel; said at least one channel and the conductive material therein so positioned as to provide at least one conductor interconnecting preselected ones of said plurality of locations; said at least one other channel and the conductive material therein so positioned as to provide at least one other conductor interconnecting other preselected ones of said plurality of locations, and insulated from the conductive material filling said at least one channel.

4,487,994

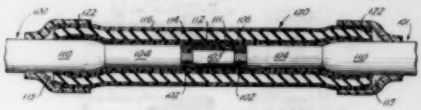
ELECTRICAL CABLE JOINT STRUCTURE AND METHOD OF MANUFACTURE

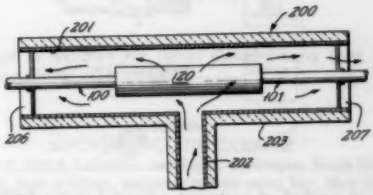
George Babder, Edison, N.J., assignor to Cable Technology Laboratories, Ltd., New Brunswick, N.J.

Filed Nov. 9, 1981, Ser. No. 319,429

Int. Cl.³ H02G *15/184*

U.S. Cl. 174—73 R **17 Claims**





1. In a joint structure for insulating the junction of a plurality of electrical cables each having a coaxial electrical conductor, said conductors being connected at said junction, a heat shrunk composite tube comprising, in successive, substantially coaxial layers over said conductors at said junction, an inner conductor shield semiconducting layer, an insulation layer, and an outer insulation shield semiconducting layer, said inner and outer shield semiconducting layers being intimately joined to said insulation layer, thereby preventing the occurrence of partial discharge under voltage conditions, the joint structure further comprising a substantially coaxial, highly resistive semiconducting layer disposed intermediate said conductors and said inner conductor shield semiconducting layer, said highly resistive semiconducting layer being substantially coextensive along said cables with said inner conductor shield semiconducting layer to define, in cooperation therewith, a dual layer conductor shield for said joint.

14. A method for manufacturing a joint structure for insulating the junction of electrical cables each having a conductor and successive coaxial layers defining an insulation layer and an insulation shield semiconducting layer, said method comprising the steps of:

cutting back the insulation layer from the cable conductors to expose the ends of the conductors;

cutting back the insulation shield semiconducting layers of the cable conductors to expose lengths of cable insulation layer equal to one inch for each 10 KV of rated voltage;

connecting the ends of the conductors with a connecting piece having a diameter less than the diameter of the cable insulation layer;

applying a semiconducting tape over the ends of the conductors and the connecting piece to a diameter approximately equal to the outside diameter of the cable insulation layer;

covering the cable insulation shield semiconducting layers, cable insulation layers, and semiconducting tape with a layer of highly resistive semiconducting, readily deformable material; and

heat shrinking, over the layer of highly resistive semiconducting material, a heat shrinkable composite tube having an inner conductor shield semiconducting layer, a layer of insulation and an outer insulation shield semiconducting layer intimately joined together in successive coaxial layers.

4,487,995

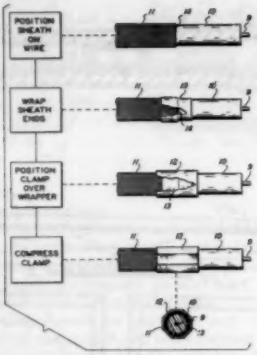
ANCHORING BRAIDED METAL SHEATH ON IGNITION WIRE

Scott L. Hurwitz, Fairport, N.Y., assignor to Magnum Shielding Corp., Pittsford, N.Y.

Continuation-in-part of Ser. No. 459,054, Jan. 19, 1983,. This application Sep. 6, 1983, Ser. No. 529,602

Int. Cl.[3] H02G *15/02*

U.S. Cl. 174—74 R 8 Claims



1. A method of anchoring a braided metal sheath on a smooth cylindrical outer surface of an ignition wire so that said sheath does not move axially of said ignition wire and does not short out said ignition wire, said method comprising:

a. sliding a length of said sheath over said smooth cylindrical outer surface of a longer length of said ignition wire and positioning said sheath so each end of said sheath is spaced at an electrically insulating distance from a respective terminal end region of said wire;

b. winding a wrapper of a thin flat adhesive tape over each end of said sheath so that each tape wrapper overlaps an end region of said sheath and said smooth outer surface of said ignition wire adjacent said end region of said sheath and holds wire ends of said sheath against said ignition wire;

c. arranging a ferrule over each of said wrapped ends of said sheath so that said ferrules overlie and conceal said tape wrappers and said ends of said sheath; and

d. compressing said ferrules radially inward against said tape wrappers, said sheath, and said ignition wire so that holding pressure from each of said compressed ferrules presses an inner surface of said tape wrapper tightly against said end region of said sheath and said smooth surface of said ignition wire adjacent said end region of said sheath and presses an inner surface of said ferrule tightly against an outer surface of said tape wrapper to hold said ferrules and said sheath securely in place on said ignition wire at said electrically insulating distance from said terminal end regions of said wire.

7. An ignition wire sheathing system for holding a braided metal sheath on a smooth cylindrical outer surface of an ignition wire so that said sheath does not move axially of said ignition wire and does not short out said ignition wire, said system comprising:

a. said sheath being arranged over said smooth cylindrical outer surface of said ignition wire so that each end of said sheath is spaced at an electrically insulating distance from a respective terminal end region of said wire;

b. a wrapper of thin flat adhesive tape wound over each end of said sheath so that each tape wrapper overlaps an end region of said sheath and holds the ends of said sheath against said ignition wire;

c. a ferrule arranged over each of said wrapped ends of said sheath so that said ferrules overlie and conceal said tape wrappers and said ends of said sheath; and

d. said ferrules being radially compressed so that each of said ferrules presses an inner surface of said tape wrapper tightly against said end region of said sheath and presses an inner surface of said ferrule tightly against an outer surface of said tape wrapper to hold said ferrules and said sheath securely in place on said ignition wire at said electrically insulating distance from said terminal end regions of said ignition wire.

4,487,996

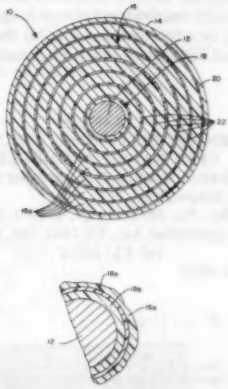
SHIELDED ELECTRICAL CABLE

Mario Rabinowitz, Redwood City, and E. Robert Perry, Portola Valley, both of Calif., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Dec. 2, 1982, Ser. No. 446,193

Int. Cl.[3] H01B *9/02*

U.S. Cl. 174—105 R 3 Claims



1. An electrical coaxial cable including an inner conductor, a radially spaced concentric outer conductor and a concentric layer of dielectric material disposed between said inner and outer conductors for electrically insulating the two from one another, the improvement comprising the inclusion of at least three coaxial shields, an innermost one of which is located between the outermost surface of said inner conductor and the innermost surface of said dielectric layer, a second one of which is located between the outermost surface of said dielectric layer and the innermost surface of said outer conductor and the remaining shield or shields being disposed within said dielectric layer so as to divide it up into individual, thinner circumferential segments which together display a higher dielectric strength than the overall dielectric layer would display if it remained unsegmented, said remaining shields also serving to confine any electric field perturbation and/or corona discharge in any particular segment of said dielectric material to that segment, each of said shields being formed of an electrically conductive, bendable polymer which is continuously electrically conductive throughout its extent so as to substantially eliminate the presence of any internal electric fields and smooth at their interfaces with said dielectric material so as to substantially prevent electric field enhancement within the dielectric material, the innermost one of said shields being supported on a layer of dielectric material which is highly filled with carbon particles and which is disposed between said innermost shield and said inner conductor.

3. An electrical coaxial cable including an inner conductor, a radially spaced concentric outer conductor and a concentric layer of dielectric material disposed between said inner and outer conductors for electrically insulating the two from one another, the improvement comprising the inclusion of at least three coaxial shields, an innermost one of which is located

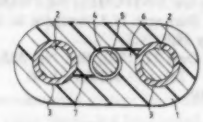
between the outermost surface of said inner conductor and the innermost surface of said dielectric layer, a second one of which is located between the outermost surface of said dielectric layer and the innermost surface of said outer conductor and the remaining shield or shields being disposed within said dielectric layer so as to divide it up into individual, thinner circumferential segments, each of said shields being formed of an electrically conductive polymer which is continuously electrically conductive throughout its extent so as to substantially eliminate the presence of any internal electric fields and smooth at their interfaces with said dielectric material so as to substantially prevent electric field enhancement within the dielectric material, said electrically conductive polymer being selected from the group consisting of polyacetylene, polyparaphenylene, and polypyrrole.

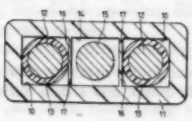
4,487,997

ELECTRIC CABLE

Neville J. Ditchfield, Chester, England, assignor to BICC Public Limited Company, London, England

Filed Jun. 9, 1983, Ser. No. 502,874
Int. Cl.³ H01B 7/08
U.S. Cl. 174—115 **7 Claims**





1. An electric wiring cable comprising an extruded elongate body of electrically insulating material, two electrically insulated line conductors which are arranged substantially parallel to one another and are transversely spaced apart within and bounded substantially wholly by material of said extruded elongate body, a bore extending lengthwise within the elongate body between and substantially parallel to the insulated line conductors, and a bare earth conductor loosely housed in said bore, the portions of the extruded elongate body separating the bore loosely housing the earth conductor from the insulated line conductors effectively being slit transversely throughout the length of the cable, thereby transversely dividing each of said portions of the elongate body into two parts.

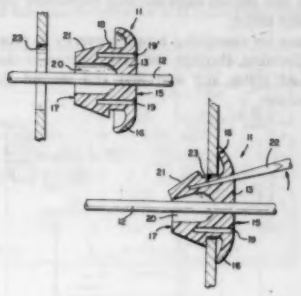
4,487,998

RELEASABLE GROMMET

Warren J. Pegram, Greensboro, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jul. 27, 1983, Ser. No. 517,617
Int. Cl.³ H01B 17/26; F16L 5/00
U.S. Cl. 174—153 G **7 Claims**

1. A grommet having a stiffly resilient body formed with a laterally extending mounting flange axially spaced from a laterally extending detent shoulder for securing the grommet in an aperture in a panel received between the mounting flange and detent shoulder, and a tool receiving socket extending into the body parallel to a cable receiving axis and adjacent the detent shoulder enabling receipt of a straight, lever-form release tool between a cable, anchored by the grommet, and detent shoulder and subsequent pivotal movement of the release tool to withdraw the detent shoulder away from the panel towards the cable axis.

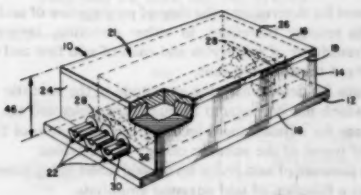


4,487,999

MICROWAVE CHIP CARRIER

Phillips C. Baird, Lakeville, and Jay S. Greenspan, South Dartmouth, both of Mass., assignors to Isotronics, Inc., New Bedford, Mass.

Filed Jan. 10, 1983, Ser. No. 457,112
Int. Cl.³ H05K 5/04
U.S. Cl. 174—52 S **20 Claims**



1. Apparatus for housing a microwave device comprising:
an all-metal housing including a base, an intermediate ring mounted to said base and in electrical contact therewith, and a lid adapted to be electrically and hermetically sealed to said ring, said ring having a side wall having a bore therethrough, and
a subminiature feedthrough inserted in said bore, said feedthrough having a coaxial configuration including a ceramic tube having an interior and exterior metal coating, and an inner conductor positioned through said tube along the longitudinal axis thereof and being in electrical contact with the interior metal coating of said tube, said tube including an at least partially cut-away portion to one side of said sidewall to expose a portion of said conductor.

4,488,000

APPARATUS FOR DETERMINING POSITION AND WRITING PRESSURE

William E. Glenn, Ft. Lauderdale, Fla., assignor to New York Institute of Technology, Old Westbury, N.Y.

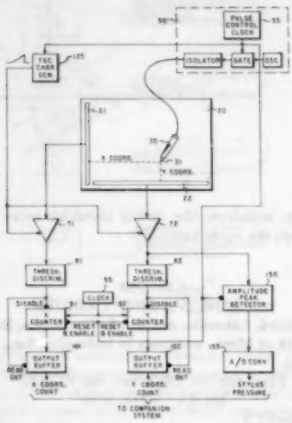
Filed Sep. 30, 1982, Ser. No. 429,785
Int. Cl.³ G08C 21/00
U.S. Cl. 178—18 **16 Claims**

1. Apparatus for obtaining position and writing pressure in a data space, comprising:
a generally flat tablet formed of a solid acoustically-conductive non-piezoelectric material;

a stylus manually movable over the tablet surface, said stylus including a piezoelectric transducer coupled to a tapered tip which contacts the surface of said tablet;

first and second fixed acoustic transducer means coupled to said tablet;

means for energizing acoustic energy to propagate in either direction, through the tablet, between the transducer of said stylus and said first and second fixed transducer means;



means for determining the time of propagation of said acoustic energy travelling, in either direction, between the transducer of said stylus and each of said first and second fixed transducer means;

means for determining the amplitude of the acoustic energy which has propagated through said tablet and tip; and

means for adjusting said amplitude as a function of the time of travel of the acoustic energy in the tablet;

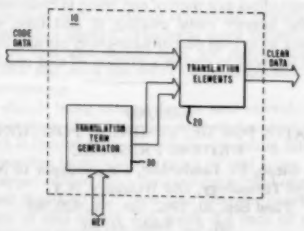
the pressure of said stylus tip on said tablet being determined as a function of said adjusted amplitude.

4,488,001

INTELLECTUAL PROPERTIES PROTECTION DEVICE

John J. Cooley, Escondido, Calif., and DuWayne D. Oosterbaan, Winter Springs, Fla., assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 17, 1981, Ser. No. 331,710
Int. Cl.³ H04L 9/02; H04K 1/02
U.S. Cl. 178—22.09 **9 Claims**



1. In a data processing system having a processor, an addressable data storage means, and a multiconductor address bus between the processor and the data storage means for transmitting addresses of data storage locations in the addressable data storage means, a device for deciphering encoded data stored in the data storage means comprising:

term generating means connected to selected address bus conductors whose number is less than the total number of conductors in said address bus, said term generating means operable for generating translation terms responsive to the states of address bits on the address conductors; and

translation means connected to the data storage means and to said term generating means, said translation means including input means for receiving addressed encoded data from the data storage means, and further being operable for performing boolean operations between the bits of said encoded data paired with the bits of translation terms generated by said term generating means thereby generating deciphered data for use by the processor;

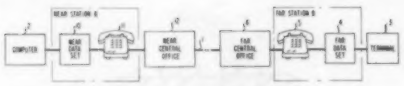
wherein said term generating means further comprises a plurality of inverters connected to selected ones of the conductors in the address bus, said term generating means being operable such that the generated translation terms are additionally generated responsive to the states of said inverters.

4,488,002

LINE CONTROL OF SWITCHED NETWORK DATA SETS

Richard R. Seibel, Barnegat, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 21, 1981, Ser. No. 333,038
Int. Cl.³ H04M 11/00
U.S. Cl. 179—2 DP **16 Claims**



1. A data set adapted for use in conjunction with a telephone set which has a talk button and a data button, said data set comprising

data communication means for transmitting voiceband data signals to, and receiving voiceband data signals from, a second data set over a voiceband telephone line,

means operative when said talk button is operated for connecting said telephone set to said line and for thereafter connecting said data communications means to said line in response to operation of said data button, said

line control means operative when said data communications means is connected to said line and said talk button is thereafter operated for transmitting to said second data set over said line a line control signal indicative of the operation of said talk button and for reconnecting said telephone set to said line no sooner than at a time subsequent to the transmission of said line control signal.

13. A method for use in a data set adapted for use in conjunction with a telephone set, said data set comprising data communication means for transmitting voiceband data signals to, and receiving voiceband data signals from, a second data set over a voiceband telephone line, and means operative when the switch hook of said telephone set is in a first position for connecting a selected one of said data communication means and said telephone set to said line, said method comprising the steps of

transmitting over said line to said second data set when said telephone set is connected to said line and said switch hook is subsequently switched to a second position a line control signal indicative to said second data set that it is desired to disconnect said telephone set from said line, and

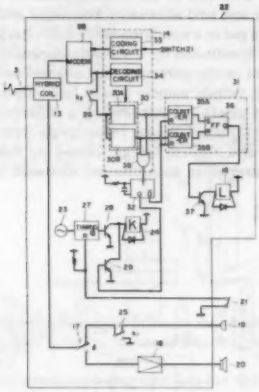
disconnecting said telephone set from said line no sooner than at a time subsequent to the transmission of said line control signal.

4,488,003

DATA COMMUNICATION SYSTEM

Toshihiko Nishimura, Kobe, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 29, 1983, Ser. No. 479,904
Claims priority, application Japan, Apr. 12, 1982, 57-62154
Int. Cl.³ H04M *11/00*
U.S. Cl. 179—2 C **5 Claims**



1. A data communication system for making a communication of data and voice through a two-wired line, comprising:

a device connected through said line to an opposite device which is adapted to transmit at least data and to receive voice, said device comprising

data receiving means for receiving said data transmitted from said opposite device,

voice transmitting means for transmitting said voice to said opposite device,

switching means for alternately disabling said data receiving means and said voice transmitting means so that data reception and voice transmission are alternately made,

line coupling means for connecting said data receiving means and said voice transmitting means to said line,

wherein said line coupling means is a hybrid coil,

said switching means alternately disconnects a connection between said data receiving means and said coupling means and a connection between said voice transmitting means and said line coupling means,

said switching means includes

pulse signal generating means for generating a pulse signal of a predetermined duty ratio, and

a relay for alternately disconnecting said connections in response to said pulse signal.

4,488,004

PROVIDING FEATURE TRANSPARENCY BETWEEN A PLURALITY OF PBXS

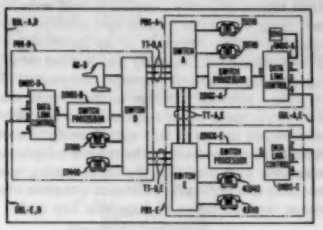
Frank J. Bogart, Boulder; Mary R. Dedisse, Denver; Radhakrishna S. Divakaruni, Boulder; Charles J. Fette, Parker; Keith S. Knight, Golden; Karen L. Page, Arvada, and Thornton S. Paxton, Broomfield, all of Colo., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 30, 1982, Ser. No. 363,421
Int. Cl.³ H04M *3/42, 7/06;* H04Q *3/54*
U.S. Cl. 179—18 AD **46 Claims**

34. In combination with a plurality of switching nodes each interconnectable by a voice path network and a data network,

means for transmitting a called station number from a first node over said voice path network to a second node for establishing a voice path call connecting between a calling station in said first node and a called station in said second node,

means for transmitting over said data network to said second node feature information required by said second node for providing additional service required on said call above and beyond the establishment of said call connection, and



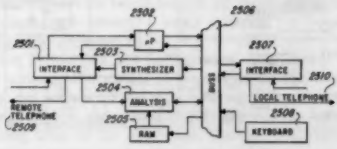
means in said second node responsive to the reception of said called number and said feature information for serving said call by establishing a connection to said called station in such a manner that said call is indistinguishable to users at said calling and called stations from an intranode call requiring the same additional service.

4,488,005

TELEPHONE ANSWERING APPARATUS WITH CALL-SCREENING CAPABILITIES

Gene A. Frantz, Lubbock, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 13, 1982, Ser. No. 377,735
Int. Cl.³ H04M *1/64, 1/66*
U.S. Cl. 179—18 B **11 Claims**



1. A telephone answering apparatus comprising:

electronic interface means adapted to be operably coupled to a first telephone and subject to being operably coupled to a second telephone remote from the first telephone when the remote telephone is operated so as to place a telephone call to said first telephone, said electronic interface means including

means for sensing an incoming telephone call from the remote telephone to said first telephone and coupling said electronic interface means into an initial incoming connection with the remote telephone but without completing the incoming telephone call to said first telephone even when said first telephone is otherwise occupied with a prior telephone call;

input/output message communication means operably coupled to said first telephone and operable to communicate a selected message to the remote telephone and to receive a message from the remote telephone intended for said first telephone, said input/output message communication means including

memory means storing digital speech data including a plurality of reference templates representative of key codes, and

speech analysis means operably coupled to said memory means and to said electronic interface means for receiving as an input from an incoming telephone call analog speech signals representative of spoken speech, said

speech analysis means including comparator means for comparing an input analog speech signal from the remote telephone with the plurality of reference templates stored in said memory means to determine whether a match exists between the input analog speech signal and a particular one of said plurality of reference templates representative of a specific key code;

control means operably coupled to said memory means and said speech analysis means, said control means being responsive to the detection of an incoming telephone call from a remote telephone by said sensing means for activating said input/output message communication means to provide a selected message to the remote telephone; and

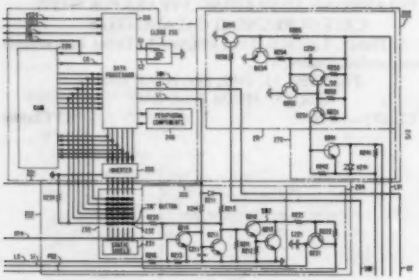
said control means being responsive to the output from said comparator means of said speech analysis means for completing the connection of the remote telephone to said first telephone provided that the input analog speech signal is matched to a particular reference template of said memory means representative of a specific key code.

4,488,006

APPARATUS FOR CONTROLLING THE APPLICATION OF TELEPHONE LINE POWER IN A TELEPHONE SET

Terrence L. Essig; Donald D. Huizinga, and Donald R. Means, all of Indianapolis, Ind., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 1, 1982, Ser. No. 394,112
Int. Cl.³ H04M 1/00
U.S. Cl. 179—81 R **7 Claims**



1. Apparatus for controlling the application of power in a telephone set characterized by

a keyboard circuit (230) comprising row and columnar switch elements scanned by a data processing means (210); one switch element (232), upon its actuation while the data processing means is shut down, providing a signal to a power supply circuit (205); the power supply circuit in turn actuating a voltage threshold detection circuit (301) for comparing the voltage level output of a power storage means (C401) with a minimum threshold voltage level and for causing a start signal to be provided to the data processing means in the event that the voltage level output of the power storage means exceeds the minimum threshold voltage level.

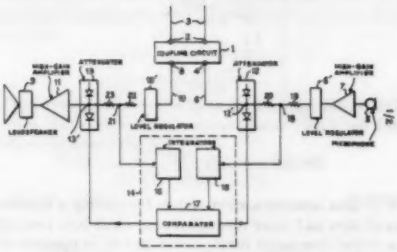
4,488,007

SPEECH-AMPLIFIER TELEPHONE STATION

André Chataignon; Jean-Pierre Poirier, and Du Phan Tich, all of Colombes, France, assignors to Thomson-CSF-Telephone, Colombes, France

Filed Dec. 16, 1982, Ser. No. 450,252
Claims priority, application France, Dec. 18, 1981, 81 23727
Int. Cl.³ H04M 1/60
U.S. Cl. 179—81 B **4 Claims**

1. A speech-amplifier telephone station comprising a first attenuator inserted in a transmission channel for connecting a microphone to a circuit which provides a coupling with a telephone line, a second attenuator inserted in a reception channel for connecting said coupling circuit to a loudspeaker, means for controlling said attenuators as a function of the relative levels of the signals collected respectively upstream of said attenuators in said transmission and reception channels, said levels being calculated respectively by integrators, and means for introducing a difference between the levels of signals collected respectively from said channels once said attenuator associated with one of the channels has been put in an attenuation state and said attenuator associated with the other channel has been put in a non-attenuation state, each attenuator aforesaid being constituted by a variable impedance which is mounted in shunt on the corresponding channel and is capable of assuming two values, namely a very low value and a very high value, said means for introducing a difference between the levels of the signals collected respectively from said channels consisting of a resistor bridge formed by means of two fixed resistors inserted in each channel aforesaid upstream of



said attenuator which is associated with said channel, and by means of said variable impedance which constitutes said attenuator, the common node of said two fixed resistors being intended to constitute the point of collection of the signal from each of said channels, each attenuator aforesaid being constituted by two diodes mounted in the same direction and having a common electrode connected to said channel which is associated with said attenuator, the other electrode of one of said diodes being put at a given potential whilst the other electrode of said diode is connected to one of the terminals of a current generator which is capable of generating a current having a first or a second value according to the control applied thereto by said control means, said diodes being such as to have a very low resistance or a very high resistance according to the current which flows through said diodes at said first or said second value, the other terminal of said current generator being put at a given potential, one of said two given potentials being intended to constitute a reference potential.

4,488,008

TELEPHONE NETWORK INTERFACE DEVICE

Thomas A. Dellinger, North Richland Hills, and Clifton G. Hampton, Bedford, both of Tex., assignors to Siecor Corporation, Hickory, N.C.

Filed Jun. 24, 1983, Ser. No. 507,589
Int. Cl.³ H04M 9/00
U.S. Cl. 179—81 R **13 Claims**

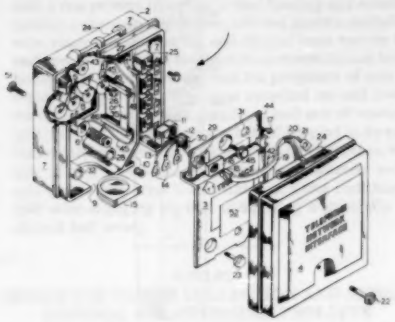
1. A telephone network interface device adapted for limited access by telephone premise owners and complete access by telephone employees comprising an open top base, composed of a backwall and an upstanding sidewall essentially circumscribing said backwall, said open top base containing:

(a) first and second set of terminals, said first set of terminals adapted to be connected to the telephone owned portion of a subscriber loop and said second set of terminals being adapted to be connected to the subscriber premise wiring;

(b) dielectric carrier and plug means both having electrical

contacts therein and both adapted to be mechanically and electrically engaged and disengaged with one another;

(c) means for electrically connecting the plug means to said second set of terminals and means for electrically connecting said dielectric carrier means to said first set of terminals;



(d) a wall means disposed between said first and second set of terminals dividing said base into first and second cavities; and,

(e) a shield means covering said first but not said second set of terminals.

4,488,009

COMPACT TELEPHONE UNIT WITH A PLUG-IN MODULE

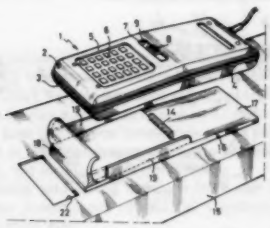
Henry Sherman, New York, N.Y., assignor to In-Electronic, Paris, France

Filed Feb. 5, 1982, Ser. No. 346,312

Claims priority, application France, Oct. 14, 1981, 81 19305

Int. Cl.³ H04M 1/00

U.S. Cl. 179—100 D **10 Claims**



1. A telephone unit comprising a case, a circuit including components and at least a microphone and a loudspeaker contained in said case, a switch connected to said circuit for selectively turning the circuit on and off, said case having a downwardly facing side defining a slot in the center thereof, a first multi-contact connector which is mounted on said case and placed in facing relation to said slot and comprises contacts which are electrically connected to at least some of said components in said case, said first connector providing a primary connection between said components when the unit is used alone and being cooperative with a second complementary multi-contact connector which may be plugged to said first connector and is connected to accessory circuits which are insertable in said circuit contained in the case by a plugging together of said first connector and said second connector, the microphone and the loudspeaker of said unit being disposed in said case adjacent a lower side of said case and respective grills being defined by said lower side of said case on each side of said slot in facing relation to said microphone and loudspeaker.

4,488,010

LOUDSPEAKER

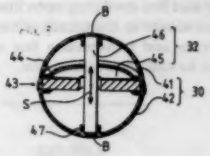
Siegfried Klein, r.Tour dÂûrgne, Paris, France, and Rainer J. Haas, Unterbuschweg, Cologne, Fed. Rep. of Germany

Filed Sep. 23, 1982, Ser. No. 422,154

Claims priority, application Fed. Rep. of Germany, Sep. 28, 1981, 3138566

Int. Cl.³ H04R 7/12

U.S. Cl. 179—110 A **14 Claims**



1. A loudspeaker, comprising:

a driving device for converting an electrical input signal connected thereto into a mechanical motion and having at least two opposite end portions at a distance from one another which changes under the action of the electrical signal;

a diaphragm of convex outer configuration extending over nearly 360° spherical angle, the diaphragm being made of a thin and relatively stiff material, nevertheless being able to deform elastically when locally excited and being coupled in at least two coupling areas of the diaphragm to the opposite end portions of the driving device, respectively, said driving device being limited by the diaphragm, and said diaphragm having a small opening for equalizing atmospheric pressure; and

means for supporting the loudspeaker, said means being fixed to the center of mass of the driving device, whereby, under the action of the electrical signal applied to the driving device, the distance between the at least two coupling areas of the diaphragm changes and elastic deformations appear on the diaphragm and give rise to emission of sound waves.

4,488,011

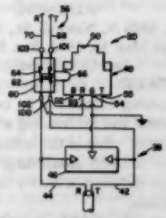
ON-PREMISE TELEPHONE TEST JACK

M. Maurice Rogers, Rte. 1, Box 214, Downsville, La. 71234

Filed May 27, 1983, Ser. No. 498,733

Int. Cl.³ H04M 1/24

U.S. Cl. 179—175.11 **13 Claims**



1. A telephone test jack adapted to be located at a subscriber's premises and connected intermediate the subscriber's on-premise telephone equipment and a telephone company's transmission line providing service to the subscriber, said telephone test jack comprising a socket sized and configured to slidably

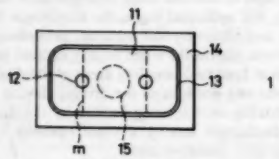
receive a line cord plug which is connected at the end of a line cord of a telephone set, ring and tip terminal elements adapted to be connected to the ring and tip conductors of said transmission line, said ring and tip terminal elements extending into said socket at positions where they are contacted by ring and tip contact elements on said line cord plug upon insertion of said plug into said socket to provide for the connection of said telephone set to said transmission line for receiving a dial tone upon transferring the telephone set to its off-hook state, and normally closed plug-actuatable switching contact means providing normal through tip and ring circuit connections between said transmission line and said telephone equipment, said switching contact means being actuatable to a circuit breaking condition by said line cord plug upon insertion of the line cord plug into said socket to electrically disconnect said telephone equipment from said transmission line upon connecting said telephone set to said transmission line.

4,488,012

MFB LOUDSPEAKER

Norio Matsuda; Yasumitsu Wada, and Masaru Chijiiwa, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Apr. 20, 1983, Ser. No. 486,780
Claims priority, application Japan, Apr. 20, 1982, 57-65997
Int. Cl.³ H04R *3/08, 23/02*
U.S. Cl. 179—115.5 R **18 Claims**



1. A motional feedback loudspeaker comprising:
a diaphragm vibratable for generating reproduced sound, and
means for detecting a vibration of said diaphragm, said means for detecting generating a voltage in proportion to a component indicative of said vibration of said diaphragm, and said means for detecting being mounted on said diaphragm at least in the vicinity of a node line of a primary resonance mode of said diaphragm.

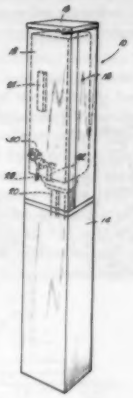
4,488,013

TELEPHONE PEDESTAL ENCAPSULATING SPLICE HOUSING

Hans J. Ziegler, 4828 N. Newhall St., Milwaukee, Wis. 53217

Filed May 16, 1983, Ser. No. 494,973
Int. Cl.³ H04M *3/26*
U.S. Cl. 179—175.1 R **25 Claims**

1. A splice housing adapted to be contained in a telephone distribution pedestal and for housing a loop of telephone cable such that the loop of cable in the splice housing can be encapsulated, the splice housing comprising
a body portion defining a cavity for housing the loop of telephone cable,
a face plate joined to said body portion, said face plate including a forward surface adapted to support a terminal block, and said face plate being joined to said body portion for movement with respect to said first clam shell portion between an open position wherein the interior of the said body portion is accessible and a closed position wherein said body portion and said face plate define a closure containing the cable therein and adapted to contain liquid



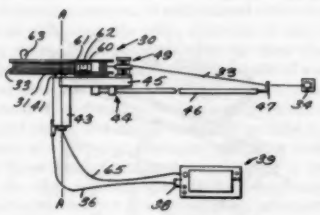
encapsulant poured into the splice housing and to encapsulate the cable.

4,488,014

REELING ASSEMBLY

Vernon T. Daniel, Oak Ridge; Edward J. Robbins, and Kenneth Y. Wang, both of Greensboro, all of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Continuation of Ser. No. 411,617, Aug. 26, 1982, abandoned, which is a division of Ser. No. 221,811, Dec. 31, 1980, Pat. No. 4,360,277. This application May 25, 1984, Ser. No. 614,389
Int. Cl.³ H02G *11/02;* **B65H** *75/26, 54/30*
U.S. Cl. 191—12.2 R **19 Claims**



1. A reeling assembly comprising:
a reel;
an electrically conductive wire wrapped about the periphery of said reel;
an electrical conductor affixed to said wire at one end thereof, and the other end of the wire operatively affixed to said reel;
an electrically conductive member stationary with respect to said reel and electrically connected to said wire and adapted to electrically connect said wire to a component remote from said reel;
means for mounting said reel for rotation about an axis to take up and let out said wire while providing electrical continuity between said wire on said reel and said stationary electrically conductive member: said reel mounting means including a shaft extending from the center of said reel along its axis of rotation; and a handle surrounding said shaft and coextensive with said axis of rotation, and not rotatable with said reel;
means attached to said reel to effect active rotation thereof

about its axis of rotation for letout and takeup of wire from and to said reel; and

wire control means for facilitating letout and takeup of wire from and to said reel from a predetermined area of said reel periphery; said wire control means including a hollow housing mounted to said handle and extending radially outwardly thereof to a point past the periphery of said reel, a rod portion mounted to said housing and extending radially outwardly therefrom, said rod portion including a wire guide mounted at the end thereof most remote from said reel, a level wind mechanism mounted to said hollow housing on an area thereof past the periphery of said reel, a pair of wire controlling arms mounted on said housing for rotation about an axis parallel to said axis of rotation of said reel, and having portions thereof adapted to be spring biased into engagement with the wire on the reel on either side of said level wind mechanism; and wherein each of said controlling arms has mounted at a free end thereof a said wire-engaging portion comprising a generally tear-shaped leaf spring.

4,488,015

DEVICE FOR POWER COLLECTION AND MOTOR CONTROL FOR OVERHEAD TROLLEYS

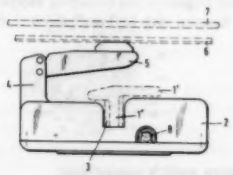
Manfred Geng, Grenzach-Wyhlen, Fed. Rep. of Germany, assignor to Blaser & Translift Gesellschaft Für Hebe-Und Förderanlagen mbH, Lucerne, Switzerland

Filed Jul. 23, 1982, Ser. No. 401,365

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1981, 8121649[U]

Int. Cl.³ B60L *5/38;* **B61B** *3/02*

U.S. Cl. 191—45 A **4 Claims**



1. In an overhead trolley system having a rigid rail structure including at least one power track, an electrically driven overhead trolley mounted on said rail structure including a trolley chassis having a rear side facing away from said rail structure, and at least one carbon brush engageable with a respective one of said at least one power track and carried by said overhead trolley, the improvement comprising:

a casing, said casing having a front side facing said at least one power track of said rail structure, a top side and a bottom side;

snap-lock means for releasably mounting said casing to the rear side of said trolley chassis; and

said at least one carbon brush carried on the front side of said casing in engagement with said at least one power track.

4,488,016

MEMBRANE SWITCH HAVING CROSSING CIRCUIT CONDUCTORS

Kazutoyo Fukukura, Reading, Mass., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 24, 1983, Ser. No. 460,333

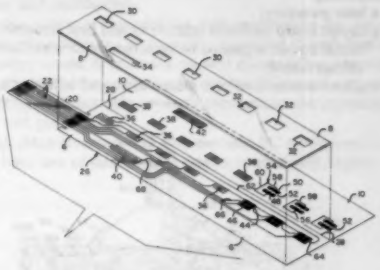
Int. Cl.³ H01H *9/26*

U.S. Cl. 200—5 A **10 Claims**

1. A membrane switch assembly of the type comprising a substrate having first and second switch electrodes thereon which are adjacent to, and electrically isolated from, each other at a switch site, a membrane which is parallel to and adjacent to, the substrate, the membrane having a commoning conductor thereon at said switch site which is opposed to the first and second switch electrodes, separator means between the membrane and the substrate serving to maintain the membrane in spaced relationship to the substrate, the separator means being discontinuous at the switch side so that the membrane can be flexed towards said substrate with resulting contact of both the first and second switch electrodes by the commoning conductor thereby electrically to common the first and second switch electrodes, the membrane switch assembly being characterized in that:

the substrate has a circuit conductor thereon which extends between the first and second switch electrodes,

the commoning conductor comprises first and second commoning pads which are opposed to the first and second switch electrodes respectively, and which are separated from each other by a commoning conductor passageway which is opposed to the circuit conductor,



the first and second commoning pads are electrically connected to each other by a bridging conductor on the membrane, the bridging conductor having first and second ends which are connected to the first and second commoning pads and having an intermediate portion which is located beyond the switch site and which extends over a portion of the membrane which is maintained in spaced relationship to the substrate by the separator means whereby

upon flexure of the membrane in the vicinity of the switch site towards the substrate, the first and second commoning pads will contact the first and second switch electrodes thereby closing switch at the switch site, and the circuit conductor will not be contacted by the first and second commoning pads.

4,488,017

CONTROL UNIT FOR VIDEO GAMES AND THE LIKE

Hugh M. Lee, San Jose, Calif., assignor to Amiga Corporation, Santa Clara, Calif.

Filed Feb. 7, 1983, Ser. No. 464,311

Int. Cl.³ H01H *25/00, 13/70*

U.S. Cl. 200—5 R **24 Claims**

3. A multi-directional control unit for video games and the like, comprising

a base structure

a circuit board mounted relative to said base structure, directional circuit segments being arranged on a surface of said circuit board,

resilient conductive pad means arranged adjacent said surface of said circuit board, said resilient conductive pad means comprising a conductive surface generally coextensive with said circuit segments and means for normally maintaining said conductive surface in spaced apart relation from said circuit board surface,

a control element capable of multi-directional movement relative to said base structure,

directional actuator means associated with said control element adjacent said conductive pad means, said directional actuator means being responsive to movement of said

control element for urging a portion of said conductive pad means into electrical contact with a circuit segment on said circuit board,

coupler means connected with said circuit segments on said circuit board, and

an adaptor element arranged for interaction with said directional actuator means to permit relative rotation of said control element in order to prevent torque forces from being applied to said pad means,

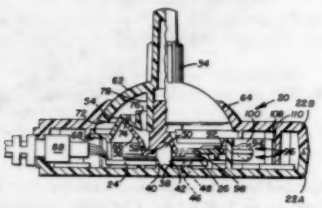
said adaptor element including cylindrical means for limiting multi-directional movement of said control element, said base structure including means for supporting said adaptor element to limit application of force from said control element to said conductive pad means.

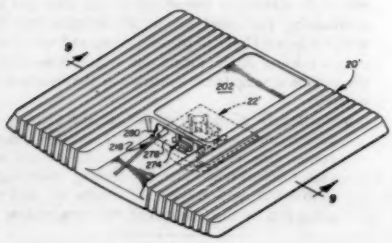
12. A multi-directional control unit for video games and the like adapted for use on a surface such as a floor or the like, comprising

a base structure,

a circuit board mounted relative to said base structure, directional circuit segments being arranged on a surface of said circuit board,

resilient conductive pad means arranged adjacent said surface of said circuit board, said resilient conductive pad means comprising a conductive surface generally coextensive with said circuit segments and means for normally maintaining said conductive surface in spaced apart relation from said circuit board surface,





a control element capable of multi-directional movement relative to said base structure,

directional actuator means associated with said control element adjacent said conductive pad means, said directional actuator means being responsive to movement of said control element for urging a portion of said conductive pad means into electrical contact with a circuit segment on said circuit board, and

coupler means connected with said circuit segments on said circuit board,

said base structure including platform means for supporting an operator's weight, both said base structure and said control element being adapted for interaction with the floor surface so that shifting of the operator's weight upon said platform means causes multi-directional movement of said control element relative to said base structure, said platform means being secured to said base structure and including web means adapted for engagement with the floor surface, said control element extending downwardly from said base structure to remain in generally constant alignment with the floor surface whereby shifting of the operator's weight on said platform means tends to produce multi-directional movement of said control element relative to said base structure.

4,488,018

MINIATURE SWITCH

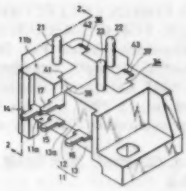
Kenji Hayashida, Muko, Japan, assignor to Hosiden Electronics Co., Ltd., Osaka, Japan

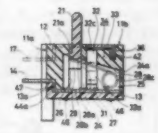
Filed Nov. 8, 1983, Ser. No. 549,712

Claims priority, application Japan, Dec. 6, 1982, 57-185235[U]

Int. Cl.³ H01H *21/00, 1/12, 13/70*

U.S. Cl. 200—6 R **14 Claims**





1. A miniature switch comprising:

a body of an insulating material;

a torsion spring made of a conductive material and held in the body;

an actuator engaged with the free end portion of a first arm of the torsion spring and held in the body in a manner to be movable in the direction in which the first arm is moved towards a second arm of the torsion spring;

a first terminal connected to the second arm of the torsion spring and fixed to the body;

a fixed contact piece held in the body between the base portion of the torsion spring and the actuator and between the first and second arms of the torsion spring, for making resilient contact with the first arm brought towards the second arm; and

a second terminal electrically connected to the fixed contact piece and fixed to the body.

4,488,019

TOUCH SIGNAL PROBE

Hideo Sakata, Kawasaki, Japan, assignor to Mitutoyo Mfg. Co., Ltd., Tokyo, Japan

Filed Apr. 6, 1983, Ser. No. 482,637

Claims priority, application Japan, Mar. 16, 1982, 57-36409

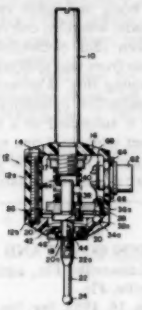
Int. Cl.³ H01H *3/16*

U.S. Cl. 200—61.42 **2 Claims**

1. A touch signal probe comprising:

a shank;

a probe case being fixed to said shank by a shank fastener;
a contact sensor shaft being held to be capable of tilting to said probe case;
a leaf spring, the inner end of which is fixed to said contact sensor shaft and the outer end of which is fixed to said probe case so that said contact sensor shaft can be regulated to the position in the diameter direction;
three stationary contact bases fixed to the inner bottom of said probe case;



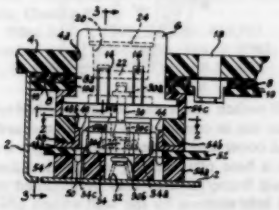
a contact plate being fixed to said contact sensor shaft and having three movable contact bases which engage with said stationary contact bases;
a spring pressing said movable contact bases to said stationary contact bases; and
a ring shaped stopper prepared and arranged with said shank fastener with a predetermined gap around said contact sensor shaft.

4,488,020

MINIATURE MULTI-POLE DOUBLE-THROW SNAP-ACTION PUSHBUTTON SWITCH WITH ALPHA-NUMERIC DISPLAY

Jack J. Zalewski, and Walter C. Theurer, both of Bradenton, Fla., assignors to Eaton Corporation, Cleveland, Ohio

Filed Feb. 23, 1983, Ser. No. 468,925
Int. Cl.³ H01H *13/26, 9/00*
U.S. Cl. 200—76 **13 Claims**



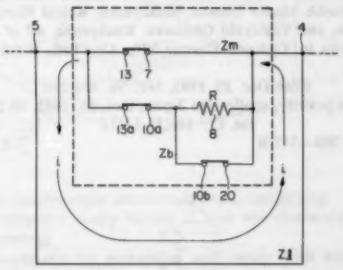
1. A miniature multi-pole snap-action pushbutton switch with lighted multi-character display comprising:
an electrically insulating housing having a hole in the top thereof;
a control PC board having a printed circuit thereon and having a hole therein large enough to freely accommodate a snap-action contact actuator means of said switch;
a plurality of contact sets around the periphery of said hole electrically coupled to said printed circuit on said control PC board, each set comprising a stationary contact and a movable contact;
snap-action contact actuator means in said housing concentrically between said contact sets for actuating said movable contacts into or out of engagement with said stationary contacts;
a pushbutton extending out through said hole in the top of said housing;
coupling means coupling said pushbutton to said snap-action contact actuator means for operating the latter upon depression of said pushbutton;
a multi-character display within said pushbutton so as to be visible from the top thereof when lighted;
a display PC board having a hole therein to freely accommodate said pushbutton;
movable contacts mounted on said pushbutton for movement therewith and electrically connected to said display;
stationary contacts mounted on and electrically connected to the printed circuit on said display PC board and contacting said movable contacts throughout the movement of said pushbutton;
and an electric connection between said PC boards enabling at least one of said contact sets to control said display.

4,488,021

GAS INSULATED DISCONNECTOR

Toshiaki Yoshizumi, Minoo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 5, 1982, Ser. No. 439,605
Claims priority, application Japan, Nov. 12, 1981, 56-182551; Nov. 12, 1981, 56-182553
Int. Cl.³ H01N *33/16*
U.S. Cl. 200—144 AP **4 Claims**



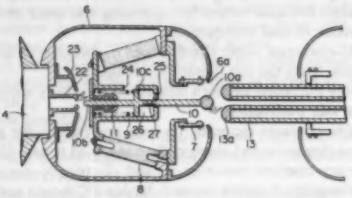
1. A gas insulated disconnector comprising:
a pair of arcing contacts;
a surge suppression resistor connected in series with said arcing contacts;
a pair of main contacts connected in parallel with the series circuit consisting of said arcing contacts and resistor;
a pair of bypass contacts connected in parallel with said resistor and in series with said pair of arcing contacts; and
means for breaking said bypass contacts apart after said arcing contacts have been broken apart during a disconnector opening operation and for bringing said bypass contacts into contact with each other after said arcing contacts are brought into contact during a disconnector closing operation.

4,488,022

MECHANISM FOR ADJUSTING THE SPEED OF DISPLACEMENT OF AN ARC CONTACT FOR A SWITCHING APPARATUS

Toshiaki Yoshizumi, Minoo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 2, 1982, Ser. No. 438,691
Claims priority, application Japan, Nov. 12, 1981, 56-182552
Int. Cl.³ H01H *33/12*
U.S. Cl. 200—146 R **7 Claims**



1. A mechanism for adjusting the speed of displacement of an arc contact for a switching apparatus comprising:

a pair of main contacts provided in the switching apparatus, one of said main contacts being movable;

an arc contact which engages said movable main contact and follows the movement of said movable main contact in the disconnecting direction;

a movable piston provided on a support supporting said arc contact and a stationary cylinder accommodating said piston; and

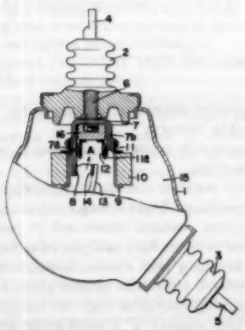
means for controlling the speed of movement of said arc contact relative to the movement of said main contact including one or more nozzle holes formed in said cylinder and one or more nozzle grooves formed in said support, said nozzle holes and nozzle grooves being arranged to communicate the inside and outside of said cylinder and control the speed of movement of said piston.

4,488,023

ROTARY-ARC TYPE GAS-FILLED SWITCH

Kenichi Matsumoto; Mashakatsu Goto; Kiyoshi Yomura, all of Yukuhashi; Masao Otsuka, Kitakyushu; Koichi Hori, Kitakyushu, and Yoshiyuki Okamura, Kitakyushu, all of Japan, assignors to Yaskawa Electric Mfg. Co., Ltd., Kitakyushu, Japan

Filed Dec. 20, 1982, Ser. No. 451,730
Claims priority, application Japan, Dec. 30, 1981, 56-210407
Int. Cl.³ H01H *33/18*
U.S. Cl. 200—147 R **1 Claim**



1. A rotary-arc type gas-filled switch comprising

(a) a gas-filled casing,

(b) a pair of stationary and movable electrodes disposed in said casing,

(c) a conductive retaining ring which encircles at least one of said electrodes,

(d) a permanent magnet of a cylindrical configuration mounted on said retaining ring,

(e) a conductive cylindrical body disposed in one end opening of said retaining ring, and

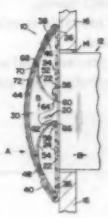
(f) an arc-drive coil encircling said conductive body, said arc-drive coil having one end connected to said conductive cylindrical body and other end connected to said stationary electrode, whereby, one root of an arc, which is generated between said electrodes upon moving said movable electrode from said stationary electrode laterally toward said retaining ring, is moved from said one electrode to said conductive cylindrical body so that other root of said arc is subjected to a magnetic flux of said permanent magnet while said one root of said arc is subjected to the magnetic flux of said arc-drive coil so as to extinguish said arc during the rotation of said arc.

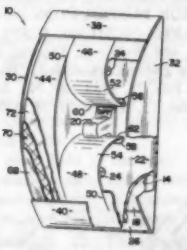
4,488,024

WALL SWITCH COVER AND ACTUATOR

Samuel O. Colgate, Gainesville, Fla., assignor to Frederick M. Butler, Jr., Gainesville, Fla.

Filed Jun. 16, 1983, Ser. No. 504,896
Int. Cl.³ H01H *3/00*
U.S. Cl. 200—330 **11 Claims**





1. A wall switch cover and actuator of the type primarily intended for use in combination with a standard wall toggle switch, said cover and actuator comprising: a frame member defined by a base plate having an aperture formed therein whereby said frame member may be mounted over the wall switch and held thereon by the wall switch cover plate, opposed first and second frame side walls extending transversely from said base plate, and opposed top and bottom frame lips extending from said base plate in transverse relation between said first and second side walls; a switch actuator means removably held by said top and bottom frame lips within said frame member said switch actuator means comprising first and second toggle fingers formed thereon, each of said fingers being dimensioned and configured to engage a corresponding first and second surface of the toggle arm used to operate the

wall switch; and a cover sheet removably held by said top and bottom frame lips within said frame member in juxtaposition to said switch actuator means, both said switch actuator means and said cover sheet being bowed and formed from a resilient material, whereby pressure applied to said cover sheet will be transferred through said actuator means to move the wall switch toggle arm.

4,488,025

COMBINED HIGH-FREQUENCY AND THERMAL HEATING OVEN

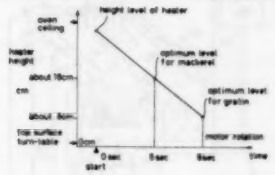
Takeshi Tanabe, Higashiosaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 28, 1982, Ser. No. 402,422

Claims priority, application Japan, Jul. 28, 1981, 56-118994; Oct. 30, 1981, 56-162884[U]; Dec. 1, 1981, 56-193973; Dec. 17, 1981, 56-204679

Int. Cl.³ H05B 9/06

U.S. Cl. 219—10.55 B **12 Claims**



1. An oven comprising:

a chamber;

support means for supporting a foodstuff within said chamber;

first means for heating the foodstuff by high frequency electromagnetic waves;

second means within said chamber for heating the foodstuff by application of thermal energy to the foodstuff, said second means being movably supported whereby it is translatable toward and away from a foodstuff on said support means;

sensor means for sensing a condition of the foodstuff during heating thereof; and

means responsive to said sensor means for identifying the foodstuff.

4,488,026

MICROWAVE OVEN WITH AUTOMATIC COOKING PERFORMANCE HAVING ADDITIONAL HEATING PROCESS

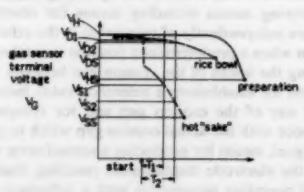
Takeshi Tanabe, Higashiosaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 1, 1982, Ser. No. 413,711

Claims priority, application Japan, Sep. 3, 1981, 56-139438; Nov. 2, 1981, 56-176075; Nov. 2, 1981, 56-176076

Int. Cl.³ H05B 9/06

U.S. Cl. 219—10.55 B **12 Claims**



1. A microwave oven comprising:

a heating chamber in which food is heated,

gas sensor means for sensing a factor concerning the atmosphere within said heating chamber of the microwave oven and providing a voltage indicative of variations in said factor,

first decision means for deciding, from timewise variations in said voltage derived from said gas sensor means, what kind of food is being heated and determining the level of the voltage where said gas sensor, means is to provide a heating stop signal, and

second decision means for deciding, in conjuction with the kind of food having the lowest rate of timewise variation of said gas sensor output, whether a timewise variation in the output of said gas sensor after reaching a given detection level thereof is greater than a predetermined timewise variation and for deciding the sub-kind of the last mentioned food from said variation.

4,488,027

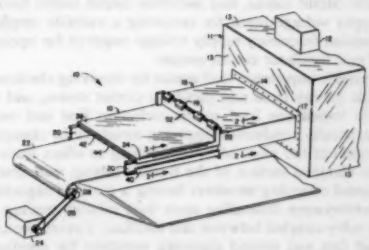
LEAKAGE SUPPRESSION TUNNEL FOR CONVEYORIZED MICROWAVE OVEN

Kenneth W. Dudley, Sudbury; E. Eugene Eves, II, Westford, and William R. Stone, Lynnfield, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Jun. 6, 1983, Ser. No. 501,322

Int. Cl.³ H05B 9/06

U.S. Cl. 219—10.55 A **8 Claims**



1. A conveyorized microwave oven, comprising:

a conductive cavity having at least one continuous access opening;

a magnetron for energizing said cavity with microwave energy;

a first tunnel having a first end connected to the outside of said cavity and surrounding said access opening, said first tunnel providing a microwave choke for the fundamental frequency of said magnetron;

a second tunnel connected to the second end of said first tunnel, said second tunnel comprising means for attenuating a broad band of microwave energy, said attenuating means comprising a first layer bonded to at least a portion of the inner surface of said second tunnel wherein the first layer comprises ferromagnetic particles;

a second layer comprising a microwave transparent material covering said first layer; and

a conveyor system for transporting product to be heated through said first and second tunnels.

4,488,028

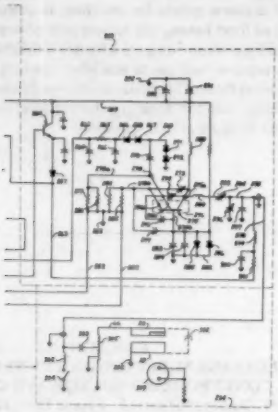
ELECTRODE MECHANICAL TUBING SEALER

Loren C. Acker, Tucson; Junius E. Taylor, Tempe, and Stephen C. Minney, Tucson, all of Ariz., assignors to Engineering & Research Associates, Inc., Tucson, Ariz.

Division of Ser. No. 334,749, Dec. 28, 1981, Pat. No. 4,390,832, which is a continuation of Ser. No. 122,293, Feb. 19, 1980, abandoned. This application Dec. 14, 1982, Ser. No. 449,638

Int. Cl.³ H05B *6/50, 6/54*

U.S. Cl. 219—10.81 **10 Claims**



1. Apparatus for sealing a piece of flexible tubing, said apparatus comprising in combination:

(a) oscillator circuit means for producing a high frequency electromagnetic output energy on an output of said oscillator circuit means, said oscillator circuit means having a supply voltage input for receiving a variable amplitude constant frequency supply voltage required for operation of said oscillator circuit means;

(b) variable impedance load means for receiving electromagnetic energy from said oscillator circuit means, said variable impedance load means including first and second electrically conductive clamping members for clamping a section of the piece of flexible tubing to effect sealing of the clamped section of the flexible tubing, said first and second clamping members having a variable capacitance therebetween depending upon their relative spacing;

(c) a cable coupled between said oscillator circuit means and said first and second clamping members for conducting the electromagnetic energy from said oscillator circuit means to said first and second clamping members, said cable having a first conductor coupled between the output of said oscillator circuit means and said first clamping member and a second conductor coupling said second clamping member to a ground voltage conductor, said first and second clamping members presenting a variable impedance to said cable when the load impedance is varied by a change in capacitance between said first and second clamping members and causing a change in voltage at the output of said oscillator circuit means;

(d) power circuit means connected to said supply voltage input for providing the variable amplitude constant frequency supply voltage to said oscillator circuit means, said power circuit means having a control input for controlling the amplitude of the supply voltage; and

(e) control means responsive to the reduced output voltage and coupled between the output of said oscillator circuit means and the control input of said power circuit means for altering the control voltage at the control input of said power circuit means to vary the amplitude of the supply voltage provided by said power circuit means to said oscillator circuit means and to vary the amplitude of the output voltage at the output of said oscillator circuit means conducted via said cable to said first and second clamping members.

4,488,029

ELECTRO-EROSIVE PROCESSING APPARATUS

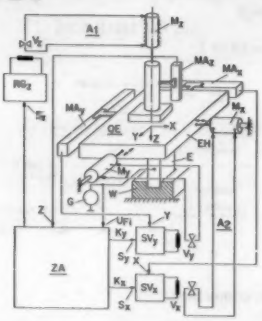
Niklaus Liechti, and Rudolf Schneider, both of Reinach, Switzerland, assignors to Erowa AG, Reinach, Switzerland

Filed Feb. 13, 1981, Ser. No. 234,592

Claims priority, application Switzerland, Feb. 13, 1980, 1184/80

Int. Cl.³ B23P *1/08*

U.S. Cl. 219—69 C **4 Claims**



1. Apparatus for electro-erosive machining comprising at least one tool electrode and one workpiece electrode which are arranged to move relative to each other in a first operating direction and in a second operating direction at an angle to said first operating direction, said apparatus comprising driving and controlling means for effecting relative movement of said electrodes in said first and second operating directions, means coordinating operation of said driving and controlling means for effecting movement of said electrodes in said first and second operating directions so as to determine the shaping of multidimensional surfaces to be formed within the workpiece electrode, said coordinating means comprising at least two separate coordinating function transmitters, said coordinating function transmitters being sequentially placed in operative connection with the driving and controlling means, shaping-limiting control means for preferentially placing one of said coordinating function transmitters in operative connection with said driving and controlling devices, a repetition circuit for sequentially placing said coordinating function transmitters in control, said repetition circuit being adapted to be activated by said shaping-limiting control means and comprising resettable storing means for storing a value indicative of the actual position of the tool electrode in one operating direction, said resettable storing means including means for resetting said storing means independently of movement in the other operating direction when a predetermined position is reached, means for measuring the width of the erosion gap between the electrodes, means for establishing a reference value indicative of the desired size of the erosion gap and for comparing the reference value with the actual erosion gap width to provide a first error signal, means for producing a second error signal by comparing the electrode displacement resulting from one or both of said operating movements with a reference displacement, and means for superimposing said first and second error signals so that a selected one of said error signal exercises overriding control of the operating movement or movements which result in electrode displacement.

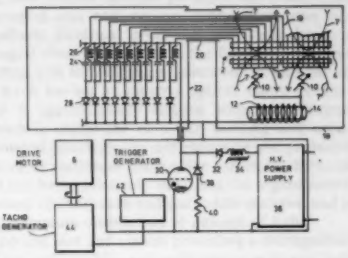
4,488,030

ELECTRICAL SPARK TREATMENT APPARATUS

James D. Cross, 41 Allen St. East, Waterloo, Ontario, Canada N2J 1J1

Filed May 24, 1982, Ser. No. 381,026
Claims priority, application Canada, Oct. 14, 1981, 387838
Int. Cl.[3] B23P 1/06; H05B 7/18
U.S. Cl. 219—69 R 14 Claims

1. Apparatus for the electrical spark treatment of materials comprising pairs of electrodes defining a plurality of spark gaps, a corresponding plurality of inductors, each connected at one end to one electrode of one of said spark gaps, a corresponding plurality of capacitors each connected to the other end of one of said inductors, a corresponding plurality of devices each connected to a juncture of one of said capacitors and one of said inductors, each said device providing a path for current charging its associated capacitor which bypasses the associated spark gap and inductor, a common switching device closable at intervals and connected in parallel with the series circuits formed by said spark gaps, said inductors and said capacitors, and a common capacitor charging circuit operative to charge each of said capacitors between closures of said switching device to a potential sufficient to break down the



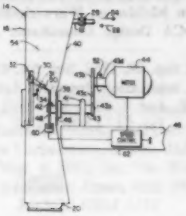
associated spark gaps simultaneously upon closure of the switching device.

4,488,031

ROTARY ELECTRODE DISC APPARATUS

Peter R. Roberts, Groton, Mass., assignor to Nuclear Metals, Inc., Concord, Mass.

Filed Apr. 13, 1983, Ser. No. 484,444
Int. Cl.³ B22F *9/10, 9/14;* B23P *1/06*
U.S. Cl. 219—69 R **8 Claims**



1. A rotary disc electrode apparatus for producing metal powders, comprising:

a chamber for maintaining a controlled atmosphere therein;

first means for mounting a first electrode in said chamber;

a rotatable shaft mounted in said chamber;

second means attachable to said shaft for securing a second electrode in the form of a consumable disc having hole means to receive one of the group of said shaft and said second means to secure said second electrode in said chamber proximate the end of said shaft confronting said first electrode said consumable disc electrode having a larger diameter than said shaft;

means for striking an electric arc between said first electrode and a circumferential portion of said disc electrode in order to melt said circumferential portion; and

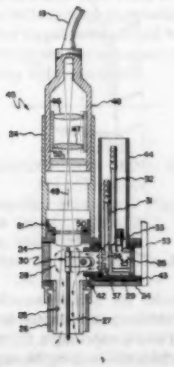
means for rotating said disc electrode at sufficient speed to enable casting off of melted circumferential portions therefrom.

4,488,032

ARC WELDING TORCH WITH INTEGRAL VISION SENSOR

Allen W. Case, Jr., Amsterdam; Norman R. Kuchar, Burnt Hills, and Donald C. Peroutky, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 401,471, Jul. 26, 1982, Pat. No. 4,450,339. This application Jun. 11, 1984, Ser. No. 619,432
Int. Cl.³ B23K *9/10*
U.S. Cl. 219—124.34 **14 Claims**



1. An electric arc welding torch with a built-in optical vision sensor for real time observation of a weld puddle comprising:

a housing to which is attached a gas nozzle;

a metal torch body in said housing having a cover gas connection and internal passages for gas flow into said housing and nozzle, internal passages for coolant flow and incoming and exit coolant connections, one of which conducts electrical power to said torch body, and an integral electrode holder in the form of a multipart projecting arm for holding an electrode in said gas nozzle;

said torch having an integral optical vision system whose axis is approximately aligned with said electrode and which is comprised of a lens housing and optical lens mounted directly over said electrode and projecting arm, the cross section of said holder perpendicular to the optical axis being relatively small and the region between said optical vision system and gas nozzle enclosed and presenting minimum obstruction to passage of light;

said optical lens and system providing a demagnified image of the weld puddle and weld region with said holder out of focus; and

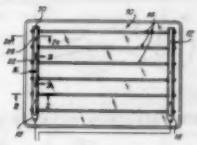
means on said torch for transferring said demagnified image to a remote welding controller.

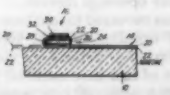
4,488,033

HEATER ASSEMBLY FOR HEATING GLASS SURFACE

Joseph J. Trachtenberg, New York, N.Y., assignor to Interdynamics, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 421,848, Sep. 23, 1982,. This application May 20, 1983, Ser. No. 496,514
Int. Cl.³ F27B *3/06*
U.S. Cl. 219—522 **13 Claims**





1. A heater assembly secured to a glass surface to be heated comprising:

(a) a plurality of heater elements each defined by an electrically conductive narrow strip backed with an adhesive coating secured by said adhesive coatings onto a glass surface in generally vertically spaced horizontally extending direction,

(b) a pair of busbars, each defined by an electrically conductive bar backed with an adhesive coating, secured by said adhesive coating onto said surface in generally vertically extending direction, one of said busbars overlying said heater elements adjacent the ends of said heater elements at one side of said surface and the other of said busbars overlying said heater elements adjacent the ends of said heater elements at the opposite side of said surface, whereby the adhesive coating on each electrically conductive bar is in engagement with the heater elements and with the glass surface intermediate said heater elements, said busbars being positioned so that the end portions of said heater elements extend beyond said busbars,

(c) said end portions of said heater elements being turned about themselves and wrapped around said busbars with the electrically conductive strip of said heater elements being in electrical engagement with the surface of the electrically conductive bar about which said end portions are wrapped, and

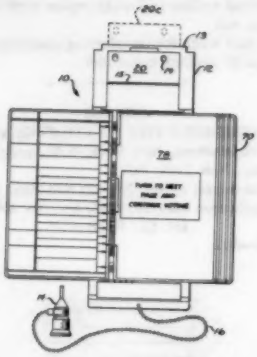
(d) a pair of covering members made of an electrically insulating material, each provided with an adhesive coating, juxtaposedly secured by said adhesive coating onto said busbars, respectively, for substantially the entire extent of said busbars, thereby retaining the wrapped around end portions of said heater elements between the busbars and the covering members.

4,488,034

DATA REGISTERING APPARATUS

Richard J. Stephens, St. Charles, Ill., and Harry H. Boucher, Dallas, Tex., assignors to Election Data Corporation, St. Charles, Ill.

Filed Jul. 14, 1982, Ser. No. 398,116
Int. Cl.³ G07C *13/00*
U.S. Cl. 235—50 A **23 Claims**



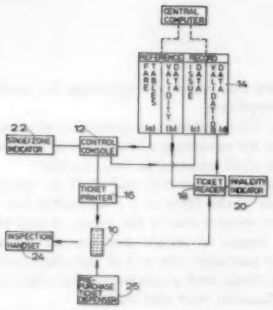
1. A data registering apparatus, including in combination:
a housing,
a base member mounted to said housing is comprised of a plurality of elongated support members spaced apart therein to define openings therein,
resilient mat means mounted to said base member and having a plurality of openings therein superimposed on said spaced apart openings defined by said plurality of elongated members of said base member,
anvil means having a plurality of openings therein fixedly mounted to said base member,
an intermediate template means having a plurality of openings therein spaced apart from and fixedly mounted to said base member,
upper mask means having a plurality of openings therein and movable from a first, at rest postion wherein the upper mask means blocks the openings in said intermediate template means and said anvil means to a second position wherein the openings in said upper mask means are in alignment with the openings in said intermediate template means and said anvil means,
spring means mounted to said housing an engageable with said upper mask means to bias said upper mask means to said first, at rest position,
an unscored data processable card insertable between said anvil means and said intermediate template means and engageable with said spring means to move the same and said upper mask means to said second position wherein the openings in said upper mask means are in alignment with the openings in said intermediate template means and said anvil means,
a rectangular holder member adapted to receive indicia thereon engageable with said housing to hold the same in registry with the data registering apparatus, and
a stylus having an angled tip thereon and adapted to be insertable through said aligned openings in said upper mask means, said intermediate template means and said anvil means to sever chips or punch portions from said unscored data processable card.

4,488,035

THROUGH-TICKETING IN A PASSENGER TRANSPORT SYSTEM

Malcolm D. N. Withnall; Martin J. Pemberton, both of Warwick, and Kevin McManus, Warwickshire, all of England, assignors to DCA Design Consultants Limited, Warwick, England

Filed Sep. 28, 1982, Ser. No. 425,373
Claims priority, application Denmark, Apr. 7, 1982, 1606/82; European Pat. Off., Apr. 7, 1982, 82301829.6
Int. Cl.³ G07B *15/02*
U.S. Cl. 235—384 **13 Claims**



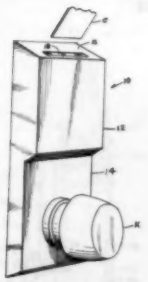
1. A passenger-carrying vehicle equipped with ticket-checking means capable of reading information presented to it on a ticket in a printed bar-code form, capable of distinguishing between valid and invalid tickets, and capable of indicating that an invalid ticket has been presented.

4,488,036

KEYCARD READER

Lawrence D. Butts, Charlotte, N.C., assignor to Scovill Inc., Waterbury, Conn.

Filed Sep. 23, 1982, Ser. No. 422,216
Int. Cl.³ G06K *13/00*
U.S. Cl. 235—482 **4 Claims**



1. A keycard reader for a high security electronic lock exposed to public vandalism and adapted to read a stiffly flexible security keycard and comprising a flat housing for mounting on a vertical surface, the housing having an upwardly and outwardly facing surface formed with an elongate slot for reception of the keycard, guide means in the housing commencing adjacent the slot with a channel portion whose en-

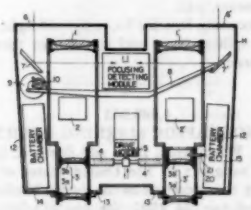
trant angle is in the range of 20° to 40° to the vertical, the guide means rapidly curving in a radius of about 0.5 inches to a vertical run parallel to the vertical surface, and reading means on the vertical run adjacent said curved portion, whereby the keycard can be conveniently inserted into the slot and the card will bend through the curved portion and straighten out adjacent the reader and, whereby the rapidly curving guide means will thwart the malicious introduction into the slot of rigid foreign bodies.

4,488,037

AUTOMATIC FOCUSING BINOCULAR

Isao Ishibai, and Kunimitsu Kobayashi, both of Tokyo, Japan, assignors to Hoya Corporation, Tokyo, Japan

Filed Mar. 4, 1982, Ser. No. 354,672
Claims priority, application Japan, May 29, 1981, 56-80753
Int. Cl.³ G01J *1/36*
U.S. Cl. 250—204 **11 Claims**



1. An automatic focusing binocular, comprising:
a housing;
an input lens system including a plurality of focusing apertures;
dual eyepiece sections, disposed behind said input lens system, each section comprising a stationary lens and a mobile lens of axial motion;
a stationary reflector, disposed directly behind one of said dual focusing apertures;
a mobile reflector, which rotates on its vertical axis, disposed directly behind the other of said dual focusing apertures;
a focus detection module, disposed between said stationary reflector and said mobile reflector and receiving images reflected by both said stationary reflector and said mobile reflector, said images being processed and compared to each other and to a reference value of light contrast; and
a warning means including an illumination source actuated upon a detection signal as produced by said focus detection module to indicate that automatic focusing is impossible for prevailing light conditions.

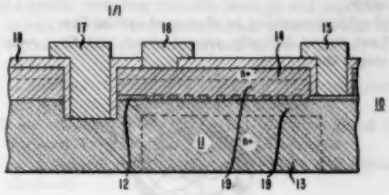
4,488,038

PHOTOTRANSISTOR FOR LONG WAVELENGTH RADIATION

Thomas R. Harrison, Fair Haven, and Ping K. Tien, Chatham Township, Morris County, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 12, 1982, Ser. No. 367,177
Int. Cl.³ H01J *40/14*
U.S. Cl. 250—211 J **8 Claims**

1. A photodetector comprising photovoltaic means and amplification means in which the photovoltaic means comprises a silicide layer forming a Schottky-barrier photosensitive junction with a portion of a silicon crystal for developing a photovoltaic signal voltage when light is incident on the photosensitive junction and in which the amplification means comprises a portion of said silicon crystal, a control element, and means for applying biases for amplification and in which



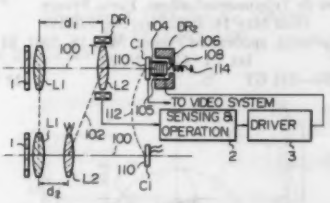
the photovoltaic signal voltage is applied to the control element for amplification.

4,488,039

IMAGING SYSTEM HAVING VARI-FOCAL LENS FOR USE IN ENDOSCOPE

Masamichi Sato; Noboru Arai, both of Asaka; Yasumasa Sunaga, Omiya, and Masafumi Inuiya, Asaka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa and Fuji Photo Optical Co., Ltd., Saitama, both of, Japan

Filed Sep. 3, 1982, Ser. No. 414,957
Claims priority, application Japan, Sep. 12, 1981, 56-144405
Int. Cl.³ G02B *5/14*
U.S. Cl. 250—216 **5 Claims**



1. An imaging system for use in an endoscope comprising:
a vari-focal lens system provided in a viewing head to be inserted into a cavity;
a solid-state imaging device for picking up an image formed by said lens system to produce electrical signals representative of the image;
supporting means for supporting said lens system and imaging device thereon so as to change the spacing between said lens system and said imaging device on the optical axis of said lens system; and
controller means operable in response to magnification of said lens system for estimating the position of a focus of said lens system to control said supporting means so as to position said imaging device substantially at the focus of said lens system.

4,488,040

FIBER OPTIC SENSOR

Donald H. Rowe, Portola Valley, Calif., assignor to GTE Products Corporation, Stamford, Conn.

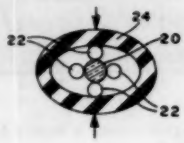
Filed Nov. 19, 1982, Ser. No. 442,984
Int. Cl.³ G02B *5/14, 5/172*
U.S. Cl. 250—227 **3 Claims**

2. A force detection system comprising
a laser,
an optical sensor cable connected at one end to said laser for transmitting light therefrom,
means to apply a transverse force to said cable whereby to change the characteristics of light transmitted by said cable, and

optical detecting means connected to the other end of said cable and responsive to changes in said light characteristics for indicating the application of said force to said cable,

said cable comprising an elongated optical fiber,

a hard strand helically wound about said fiber over the length thereof, and



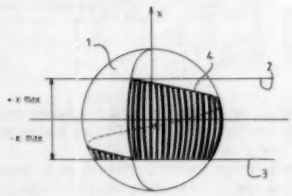
a compliant sleeve disposed around and coextensive with said fiber and said strand with the interior of said sleeve engaging only parts of said strand intersected by a single longitudinal plane through said cable whereby said fiber is responsive only to unidirectional radial forces in said plane.

4,488,041

DEVICE FOR MEASURING THE COORDINATES OF A ROTATING SPHERE AND PROCESS FOR MANUFACTURING PART OF THIS DEVICE

Jean-Jacques Baudot, Ville D'Avray, France, assignor to Societe Anonyme de Telecommunications, Paris, France

Filed May 14, 1982, Ser. No. 378,197
Claims priority, application France, May 18, 1981, 81 09876
Int. Cl.³ G01C *19/28*
U.S. Cl. 250—231 GY **11 Claims**



1. Device for determining the orientation of an axis, mobile about a point, of a solid in rotation about this axis, particularly a gyroscopic spinner, wherein said device comprises a portion of sphere centered on said point of said axis, of which the surface of said portion of sphere comprises at least two parts which are respectively absorbent and reflecting for a given radiation and one of said two parts has alternately absorbent and reflecting meridian lines, and sensor means sensitive to the radiation reflected by the sphere, the reflecting and absorbent parts being shaped so that the sensor means deliver signals characteristic of the orientation of said axis.

4,488,042

LINE SCAN READER/WRITER BY HOLOGRAPHIC COLLECTION

Burton R. Clay, Wayland, and William O. Thrailkill, Lexington, both of Mass., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 15, 1982, Ser. No. 368,494
Int. Cl.³ H01J *5/16*
U.S. Cl. 250—235 **16 Claims**

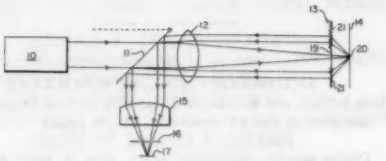
1. Apparatus comprising:

A. a light source for providing a light beam;

B. an optical light beam splitter;

C. a first focusing lens for receiving said light beam through said beam splitter;

D. collection means placed between said first lens and a surface which includes information to be read in proximity with said surface, said collection means having an unmodulated portion through which said light beam is focused onto said surface and having a modulated portion



through which diverging light from said surface is collected and directed to said beam splitter by means of said first focusing lens;

E. detector means; and

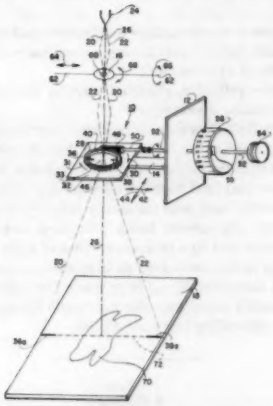
F. a second focusing lens for focusing said light received by said beam splitter from said surface for receipt by said detector means.

4,488,043

TOMOGRAPHIC MARKING DEVICE

Gunter F. Bahr, Washington, D.C., and Barry E. Schell, Silver Spring, Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 24, 1982, Ser. No. 411,116
Int. Cl.³ G01N *23/00*
U.S. Cl. 250—311 **8 Claims**



1. In an electron microscope of the type wherein a specimen on a stage in adapted to be rotated about a tilt axis that is parallel to a viewing screen, for viewing a magnified image of said specimen, and said stage is moveable in the direction of said tilt axis, the improvement of a marking device for indicating on said magnified image the portion of said specimen on said tilt axis, said device comprising:

a ring wheel,

at least one pin fixed to said ring wheel and defining a straight line, substantially parallel to said screen, and passing through the center of said wheel,

means to dispose said wheel between said specimen and said screen so that said line passes through said optical axis and a shadow of said pin projects on said screen, and

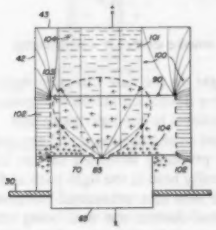
means to rotate said wheel about said optical axis to align said shadow of said pin with the location of said tilt axis on said screen, the location of said tilt axis on said screen being determined by the direction of movement of said image when said stage is moved in the direction of said tilt axis.

4,488,044

IONIZATION CHAMBER FOR SMOKE DETECTOR AND THE LIKE

Gerald D. Rork, Sleepy Hollow; Edward J. Thorp, New Lenox, and Ronald J. Zegarski, Crystal Lake, all of Ill., assignors to Pittway Corporation, Aurora, Ill.

Filed Nov. 20, 1981, Ser. No. 323,471
Int. Cl.³ H01J *47/02*
U.S. Cl. 250—381 **29 Claims**



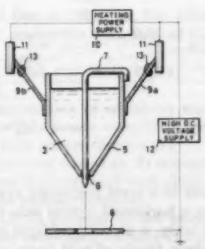
1. In a smoke detector ionization chamber having first and second electrodes connectable to a source of electric power, means defining access openings for enabling airflow into and out of the chamber and means for causing ionization within the chamber, the improvement comprising: control structure means disposed within the chamber in the path of the airflow, said control structure means cooperating with the electrodes and the associated source of electric power for establishing in the chamber an electric field having a relatively higher intensity closely adjacent to the access openings and a relatively lower intensity in the remainder of the chamber without significantly impairing the flow of neutral particles into the chamber.

4,488,045

METAL ION SOURCE

Norimichi Anazawa; Masahiko Okunuki, and Ryuzo Aihara, all of Tokyo, Japan, assignors to JEOL Ltd., Tokyo, Japan

Filed Aug. 27, 1982, Ser. No. 412,215
Claims priority, application Japan, Sep. 3, 1981, 56-139093
Int. Cl.³ H01J *27/02*
U.S. Cl. 250—423 R **13 Claims**



1. A metal ion source comprising:

(a) a funnel-shaped reservoir vessel for containing liquid metal to be ionized, said reservoir having in its bottom a capillary bore, said bottom and bore extending outwardly in symmetrical relation to an optical axis of the metal ion source;

(b) a needle extending coaxially through said capillary bore in said reservoir making no contact therewith and having a pointed end projecting beyond an outer surface of said reservoir;

(c) a plurality of conductive wires supporting said reservoir and conducting electrical current thereto;

(d) an extracting electrode having an opening and being disposed facing said capillary in said reservoir;

(e) a grounded electrode disposed below said extracting electrode;

(f) a DC voltage supply for maintaining said reservoir at a positive high potential with respect to said grounded electrode;

(g) an extracting voltage supply for maintaining said extracting electrode at a negative potential with respect to said reservoir; and

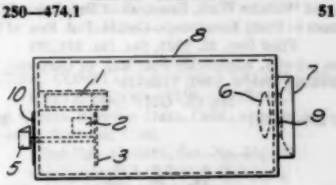
(h) a heating power supply for supplying an electric current through said plurality of wires to heat said reservoir.

4,488,046

NUCLEAR RADIATION MEASURING APPARATUS AND METHOD

Karl Bernstein, 21651 Dumetz Rd., Woodland Hills, Calif. 91364

Filed May 7, 1982, Ser. No. 375,792
Int. Cl.³ G01N *5/00*
U.S. Cl. 250—474.1 **51 Claims**



1. A method for measuring nuclear radiation comprising:

providing means sensitive to nuclear radiation;

providing a reference light source;

while viewing the light from said source and said radiation sensitive means adjusting the light reaching the viewer's eye until the apparent brightness level of light from said source and said radiation sensitive means is substantially the same; and

after adjusting the apparent brightness ascertaining quantitatively the level of nuclear radiation measured.

4,488,047

HIGH EFFICIENCY MULTIPLE LAYER, ALL SOLID-STATE LUMINESCENT SOLAR CONCENTRATOR

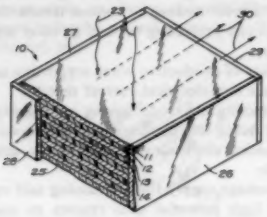
William R. L. Thomas, Holmdel, N.J., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Nov. 25, 1981, Ser. No. 324,964
Int. Cl.³ H01L *31/04; G02B 5/14*
U.S. Cl. 250—486.1 **9 Claims**

1. An all solid luminescent solar concentrator comprising:

a plurality of planar luminescent layers having a major top surface for receipt of incident solar radiation, a bottom surface, and at least one edge surface through which

radiation can escape, each of said layers having bonded on the top and bottom surface thereof a solid light transparent layer having an index of refraction which is lower than the index of refraction of the luminescent layer.



4,488,048

CONTAINER FOR THE STORAGE OF RADIOACTIVE MATERIAL

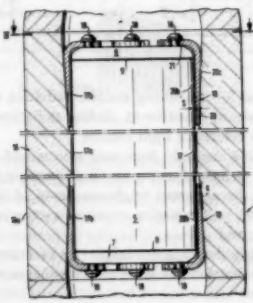
Heinz Bienek, Oberhausen; Wolfgang von Heesen, Gelsenkirchen, and Wilhelm Wick, Essen, all of Fed. Rep. of Germany, assignors to Steag Kernenergie GmbH, Fed. Rep. of Germany

Filed Dec. 16, 1981, Ser. No. 331,295

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1980, 3048380; Dec. 8, 1981, 3148528

Int. Cl.³ G21F *5/00*

U.S. Cl. 250—506.1 **25 Claims**



1. A container for the storage of radioactive material comprising:

an inner casing for receiving the radioactive material;

at least one resiliently deformable contact element formed of heat conducting material, said contact element being coupled to the inner casing; and

an outer casing made of ceramic material and having a smooth inner wall,

the inner casing being held within the outer casing solely by the contact element which is resiliently biased by deformation into friction contact with the inner wall of the outer casing, the contact between said contact element and inner wall being distributed over a large surface area of the inner wall.

4,488,049

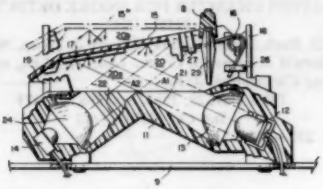
MOVING WALL TEST DEVICE IN OPTICAL SMOKE DETECTORS

Angelo A. Marsocci, Duxbury, Mass., assignor to American District Telegraph Company, Jersey City, N.J.

Filed Nov. 9, 1981, Ser. No. 319,444

Int. Cl.³ G08B *17/10*; G01N *21/53*

U.S. Cl. 250—574 **6 Claims**



1. An optical smoke detector comprising:

a base;

a source of light on the base directing light on a path;

a photosensitive device on the base responsive to light scattered by particles in the light path; and

a wall canopied over the source of light and photosensitive device and pivotally mounted on the base wherein the wall is normally held in the light path and has a substantial area on one side of a substantial volume viewed by the photosensitive device, the wall being mounted to move angularly toward the photosensitive device from a normal position in which an insignificant intensity of light is reflected by the area toward the device through intermediate angular positions closer to the device through which positions pivotal movement of the wall increases the light scattered to the device in a continuous gradient.

4,488,050

LEVEL MEASURING INSTRUMENT HAVING A STAFF WITH LIGHT-EMITTING ELEMENTS

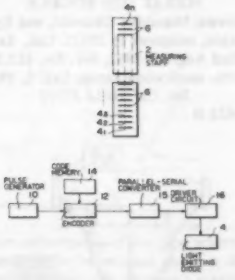
Yasuo Iwafune, Tokyo, Japan, assignor to Tokyo Kogaku Kikai Kabushiki, Tokyo, Japan

Filed Apr. 13, 1982, Ser. No. 368,009

Claims priority, application Japan, Apr. 16, 1981, 56-57749

Int. Cl.³ G01B *11/27*; G01C *15/06*

U.S. Cl. 250—578 **7 Claims**

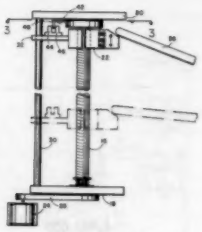


1. A staff for use in a level measuring system including an instrument having a horizontal optical axis, the staff comprising an elongated body, a plurality of light emitting elements located on and along length of said body at positions corresponding to graduations located at predetermined spacings, and means for energizing said light emitting elements so that the respective elements produce light signals indicative of the corresponding graduations which are mutually distinguishable by the instrument.

4,488,051
APPARATUS FOR SENSING LINEAR AND ROTATIONAL POSITION BETWEEN A SCREW ELEMENT AND A THREADED MEMBER

James R. Brown, Huntington Beach, and Roy W. Aday, Jr., Fullerton, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Dec. 28, 1981, Ser. No. 334,808
Int. Cl.³ G01D 5/34; G01J 3/18
U.S. Cl. 250—561 4 Claims



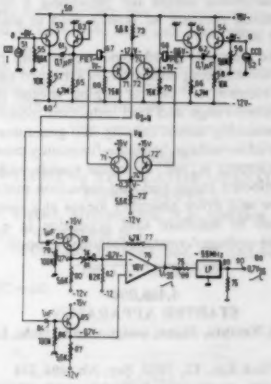
1. Positioning apparatus comprising:
a lead screw;
a load member;
means supporting the lead screw and load member for relative rotational and linear movement about and along the lead screw axis; and
a position sensor including:
a position sensing means carried by the load member for sensing linear position of said load member and rotational position of said lead screw and a position indicating means carried on said lead screw for non-contacting communication with said position sensing means when said load member arrives in a selected position along said lead screw, with relative rotational and linear movement between said position sensing means and said position indicating means; and
means for indicating communication of the position sensing means and the position indicating means when they are in a predetermined relative rotational and linear position.

4,488,052
METHOD AND SYSTEM TO REDUCE LOW-FREQUENCY NOISE IN SEMICONDUCTOR SENSORS

Hans-W. Zappen, Bensheim; Dieter Poetsch, Ober-Ramstadt; Klaus Lehmann, Mühltal; Friedrich Zimmermann, Rossdorf, and Klaus D. Müller, Weiterstadt, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 8, 1981, Ser. No. 328,475
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1980, 3049043
Int. Cl.³ H01J 40/14
U.S. Cl. 250—578 16 Claims

1. Method of suppression of additively superimposed noise in a semiconductor light sensor—amplifier combination having a semiconductor light sensor element (1);
clock signal supplying means (4, 5) respectively energizing the light sensor in accordance with clock signals for transfer of read-out signals therefrom;
output means (2, 3) coupled to the sensor and receiving output signals therefrom varying between a maximum level, in dependence on the intensity of incident light, and a minimum level;
and amplifier means (6, 7) amplifying the output from said output means, and providing an amplified output signal, said amplifier means introducing noise signals (U_N), the noise from the output means being at a frequency which is low with respect to the frequency of the clock signal, comprising, in accordance with the invention, the steps of
sensing the maximum value of the output signal from the amplifying means which includes the signal from the sensor and an additive component respresentative of the then instantaneous noise of the amplifying means (U_{S+N}),

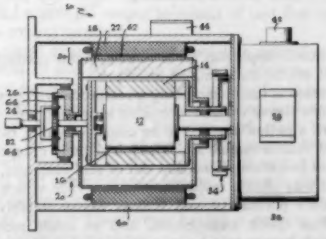


sensing the minimum value signal;
detecting the sensed maximum value signal and the sensed minimum value signal;
and subtracting the detected signals from each other to thereby eliminate low-frequency shifting effects due to said low-frequency noise.

4,488,053
ELECTRIC CONSTANT SPEED/VARIABLE SPEED DRIVE/GENERATOR ASSEMBLY

Michael J. Cronin, Sherman Oaks, Calif., assignor to Lockheed Corporation, Burbank, Calif.

Filed Feb. 17, 1981, Ser. No. 234,761
Int. Cl.³ H02P 9/00
U.S. Cl. 290—4 C 10 Claims



1. An electric constant-speed/variable-speed drive/generator unit for receiving mechanical input power from an engine and for generating electrical power comprising:
an ac synchronous generator having rotor and stator elements;
a bi-directional and variable-speed ac induction motor having rotor and stator elements;
a drive assembly coupling said engine, said generator and said motor together such that said engine drives said generator and said motor can affect the rate that said engine drives said generator;
means for controlling the speed and direction of said induction motor and for selectively operating said induction motor with said drive assembly, whereby said generator

provides constant-voltage/constant-frequency power over a preselected speed range of said engine, and variable-voltage/variable-frequency power over speeds outside said preselected range comprising:

speed logic means;

a brake element adapted to selectively operate said induction motor with said gear drive assembly;

power electronic means for providing a bi-directional synthesized rotating ac power field in said induction motor; and

said brake element, speed logic means, and power electronic means being interactively arranged such that said brake element is "on" at engine speeds outside said preselected range and said induction motor locks said drive assembly means causing said generator to operate in a variable-voltage/variable-frequency mode, and said brake element is "off" at engine speeds within

said preselected range and said induction motor operates to drive said drive assembly means at a speed and in a direction to maintain said generator in a scheduled constant-voltage/constant-frequency mode.

4,488,054

STARTER APPARATUS

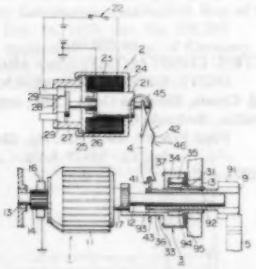
Kohei Ebihara, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 12, 1983, Ser. No. 484,274

Claims priority, application Japan, Apr. 13, 1982, 57-61319; Jun. 2, 1982, 57-80609[U]; Sep. 1, 1982, 57-150754

Int. Cl.³ F02N *11/00, 15/06*

U.S. Cl. 290—38 A **4 Claims**



1. A starter apparatus for a vehicle engine comprising:

a D.C. motor including an armature,

a solenoid actuator including a reciprocative plunger,

a hollow sleeve which is provided at one end portion thereof with a pinion adapted to be engaged with a ring gear of said vehicle engine and which is slidably mounted upon a shaft projecting from one end of said armature,

a one way clutch including an inner race which houses a middle portion of said hollow sleeve slidably through helical spline engagement, and an outer reducer race which houses said inner race through rollers at a larger inner diameter portion of said outer reducer race and which is fixed at free end thereof to said armature shaft, and

a shift lever driven by said plunger so as to reciprocate said hollow sleeve to disengage or engage said pinion with said ring gear through an annulus plate, characterized in that:

a free end portion of a smaller inner diameter portion of said outer reducer race is fixed to said armature shaft;

said hollow sleeve is provided at the other end portion thereof with an annular groove;

a wall of said smaller inner diameter portion of said outer reducer race is provided at least one opening having a circumferential width and an axial length;

at least a portion of an inner circumferential edge of said annulus plate having a circumferential length smaller than the circumferential width of said opening extends radially inwardly into said annular groove through said opening;

the rest of said inner circumferential edge of said annulus plate encloses said wall of the smaller inner diameter portion of said outer reducer race; and

said axial length of said opening in said outer reducer race is sufficient to permit said annulus plate to reciprocate said hollow sleeve to engage said pinion with said ring gear.

4,488,055

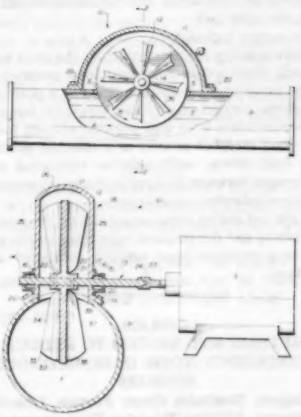
FLUID PIPE GENERATOR

James Toyama, 1980 Cedar Ave., Long Beach, Calif. 90806

Filed Mar. 10, 1982, Ser. No. 356,629

Int. Cl.³ F01P *3/12;* **F03D** *1/04;* **H02K** *7/18;* **F16D** *31/00*

U.S. Cl. 290—53 **15 Claims**



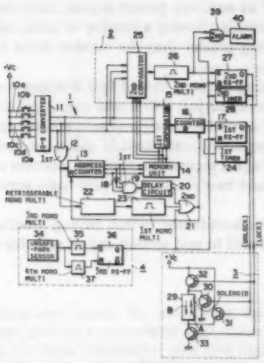
1. A fluid motor for use in conjunction with a liquid containing pipe comprising, in combination, a housing with a disc having vanes contained therein, said disc centrally mounted on a shaft supported in said housing in such a position so that said disc extends only partially into the pipe, said vanes on side faces of said disc to engage the liquid passing through the pipe whereby liquid motion through the pipe causes rotation of said disc and said shaft associated therewith, wherein said vane includes a leading edge proximate to but just below a peripheral rim portion of said disc, said leading edge tapering away from said peripheral rim in an arcuate fashion, to a side edge of said vane, wherein said side edge includes a substantially linear portion tapering and narrowing towards said shaft, terminating in an arcuate root portion at a base area of said vane, wherein said vane has a concave front face and a convex back face relative to the direction of liquid flow to enhance the fluid flow rate, and wherein said housing includes a pressurized upper area, sealing means interposed between the pipe and said housing, such that liquid flow migration within said housing is retarded.

4,488,056

ELECTRONIC DOOR LOCKING SYSTEM FOR AN AUTOMOTIVE VEHICLE

Haruo Mochida, Kiyokawa, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed Nov. 18, 1982, Ser. No. 442,746
Claims priority, application Japan, Jan. 14, 1982, 57-3324
The portion of the term of this patent subsequent to Jan. 24, 2001, has been disclaimed.
Int. Cl.³ H01H *47/00*
U.S. Cl. 307—10 AT **13 Claims**



2. An electronic door locking system for an automotive vehicle for locking/unlocking vehicle doors, which comprises:

(a) plurality of switches for outputting at least one predetermined door-locking octal coded digit and a sequence of predetermined door-unlocking octal coded digits;

(b) an octal-binary code converter connected to a plurality of said switches for converting the octal coded digits inputted from said switches into corresponding binary coded digits;

(c) an address counter connected to said octal-binary code converter for counting up a number of the binary-coded digits outputted from said octal-binary code converter whenever one of said switches is depressed and outputting an address-designation signal in response to the number of digits outputted from said octal-binary code converter;

(d) a memory unit connected to said address counter for outputting a previously stored binary coded digit in response to the address-designation signal outputted from said address counter;

(e) a first comparator connected to said octal-binary code converter and said memory unit for outputting a signal when one of the binary coded door-unlocking digits outputted from said octal-binary code converter agrees with one of the binary coded door-unlocking digits outputted from said memory unit in response to the respective address-designation signal outputted from said address counter;

(f) a counter connected to said first comparator for outputting a signal when said first comparator outputs said signal thereof;

(g) a first reset-set flip-flop connected to said counter for outputting a door unlocking command signal when said counter outputs the signal thereof;

(h) a second comparator connected to said octal-binary code converter and said memory unit for outputting a signal when at least one binary coded door-locking digit outputted from said octal-binary code converter agrees with at least one binary coded door-locking digit outputted from said memory unit in response to the address designation signal outputted from said address counter;

(i) a second reset-set flip-flop connected to said second comparator for outputting a door locking command signal when said second comparator outputs the signal thereof;

(j) a door lock/unlock actuating solenoid connected to said first and second reset-set flip-flops for unlocking the vehicle doors when said first reset-set flip-flop is set and locking the vehicle doors when said second reset-set flip-flop is set;

(k) means for detecting that the automotive vehicle is left parked in an unsafe state and outputting an unsafe-park signal; and

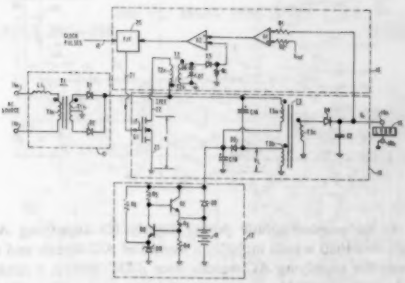
(l) means for disabling the door locking command signal by resetting said second reset-set flip-flop in response to the unsafe-park signal from said detecting means.

4,488,057

AC-DC SWITCHING REGULATOR UNINTERRUPTIBLE POWER SUPPLY

Patrick W. Clarke, Murray Hill, N.J., assignor to OPT Industries, Inc., Phillipsburg, N.J.

Filed Jul. 15, 1983, Ser. No. 513,842
Int. Cl.³ H02J *9/06*
U.S. Cl. 307—66 **17 Claims**



1. An uninterruptible power supply, comprising:

a power transformer having a primary winding adapted to be connected to an AC power source, and a secondary winding;

a first rectifier connected to said secondary winding and having a pair of output terminals;

a switching device having first and second main terminals coupled across the output terminals of said first rectifier, and a control terminal;

control signal generating means operative regardless of the condition of said AC power source for applying periodic control signals to said control terminal of said switching device to alternately render said switching device conductive and nonconductive between said main terminals thereof, the frequency of said control signals being substantially higher than the frequency of said AC power source, said control signals having a variable duty cycle;

a pair of output terminals adapted for connection to a load;

an energy storage transformer having a primary winding and a secondary winding,

one terminal of the primary winding of said energy storage transformer being coupled to said first main terminal of said switching device,

another terminal of the primary winding of said energy storage transformer being adapted to be connected to a DC power source;

a second rectifier and a filter coupled between said secondary winding of said energy storage transformer and said output terminals;

said energy storage transformer transferring energy to said load via the secondary winding thereof, said second rectifier and said filter when said switching device is nonconductive between the main terminals thereof; and

a first capacitor coupled to said primary winding of said energy storage transformer for (i) receiving energy from

said AC power source via said power transformer and first rectifier when the voltage of said AC power source is at least equal to a predetermined threshold value, and (ii) receiving energy from said DC power source when the voltage of said AC power source is below said predetermined threshold value,

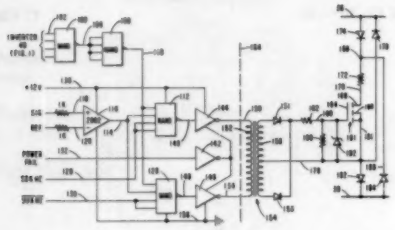
said first capacitor receiving energy when said switching device is nonconductive and transferring energy to said energy storage transformer when said switching device is conductive.

4,488,058

SNUBBER CIRCUIT FOR USE IN AN UNINTERRUPTIBLE POWER SUPPLY

Harold H. Cheffer, Longwood, Fla., assignor to NCR Corporation, Dayton, Ohio

Filed Aug. 22, 1983, Ser. No. 525,370
Int. Cl.³ H02J 9/00; H02M 7/12
U.S. Cl. 307—66 **14 Claims**



6. In an uninterruptible power supply for supplying AC signals to a load which includes a source of AC signals and an inverter for supplying AC signals from a DC source, a circuit for regulating switching current transient generated in switching the inverter to the load including:

logic circuit means for generating a first control signal upon sensing the occurrence of a current transient in the AC output of the inverter;

a source of second control signals generated in response to the failure of the source to supply AC signals to the load;

transistor means connected to the output of the inverter and the load for connecting the output of the inverter to the load when enabled;

a drive transformer connected to said transistor means for enabling said transistor means when operated;

a source of first and second high frequency clock signals;

and control means enabled upon the simultaneous occurrence of said first and second control signals to output the clock signals to said drive transformer to cyclically operate said drive transformer whereby said transistor is cyclically enabled to connect the output of the inverter to the load until the current transient is eliminated.

4,488,059

SEMICONDUCTOR SWITCH DEVICE

Masahiko Akamatsu, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 201,562, Oct. 28, 1980, abandoned, which is a continuation of Ser. No. 001,167, Jan. 5, 1979, abandoned, which is a continuation of Ser. No. 798,675, May 19, 1977, abandoned, which is a continuation-in-part of Ser. No. 704,533, Jul. 12, 1976, Pat. No. 4,066,956. This application Sep. 13, 1982, Ser. No. 417,632
Claims priority, application Japan, Sep. 12, 1975, 50-111315
Int. Cl.³ H03K 17/60, 17/94
U.S. Cl. 307—253 **3 Claims**

1. A semiconductor switch device, comprising:

a main circuit carrying a main current, said main circuit including a first winding;

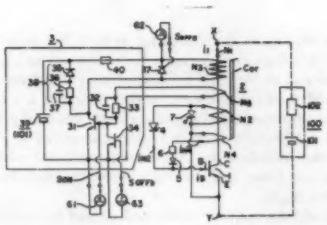
a main semiconductor switch in said main circuit, having collector and emitter electrodes connected to said circuit and a base electrode;

a second winding coupled to said first winding through a magnetic core, having a first end connected to the emitter electrode of said main semiconductor switch and a second end connected to said base electrode of said main semiconductor switch through a first diode;

a third winding coupled to said first winding through said magnetic core, having a first end connected to a first terminal of an auxiliary power source, and a second end, said third winding having a number of turns, said number of turns being greater than the number turns of said second winding;

a fourth winding coupled to said first winding through said magnetic core, having a first end connected to said first end of said second winding and said emitter electrode of said main semiconductor switch and a second end connected through a second diode to the junction of said first diode and said base electrode of said main semiconductor switch;

an auxiliary semiconductor switch having a collector electrode connected to said second end of said third winding,



an emitter electrode connected to a second terminal of said auxiliary power source and a base electrode;

means for supplying a first control signal having a first terminal connected to said base electrode of said auxiliary semiconductor switch and a second terminal connected to said emitter of said auxiliary semiconductor switch, said control signal having an on condition and an off condition, said on condition causing said auxiliary semiconductor switch to conduct, and allowing a first current to flow in a series circuit of said auxiliary power source, said third winding and said auxiliary semiconductor switch, said first current inducing a second current to turn on said main semiconductor switch, said second current flowing in a circuit including said fourth winding, said second diode, and said base and emitter electrodes of said main semiconductor switch, said off condition allowing said auxiliary semiconductor switch to turn off and stop said first current flow, the change in magnetic flux in said core varying thereby and inducing a third current to turn on said main semiconductor switch, said third current flowing in a circuit including said second winding, said first diode and said base and emitter electrodes of said main semiconductor switch, wherein said main semiconductor switch, is rendered conductive under either condition of said first control signal.

4,488,060

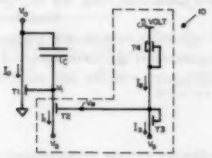
HIGH VOLTAGE RAMP RATE CONTROL SYSTEMS

Richard T. Simko, Los Altos, Calif., assignor to Xicor, Inc., Milpitas, Calif.

Continuation-in-part of Ser. No. 230,683, Feb. 2, 1981, , Ser. No. 6,026, Jan. 24, 1979, Pat. No. 4,314,265, and Ser. No. 6,030, Jan. 24, 1979, Pat. No. 4,274,012. This application May 27, 1982, Ser. No. 382,767

Int. Cl.³ H03K 5/08, 5/12, 6/04

U.S. Cl. 307—263 12 Claims



1. An integrated circuit for controlling the ramp rate of a high voltage generator comprising high potential input means for making electrical connection with said high voltage generator; grounding means for making electrical connection with a reference potential current sink; a control potential node; ramp rate current control means responsive to a control potential at said control potential node for regulating the flow of current between the high potential input means and the grounding means; capacitive coupling means for capacitively coupling said control potential node to the high potential input means; a reference potential node; and control potential node discharge means for controlling current flow between the control potential node and the reference potential node.

4,488,061

DRIVE CIRCUIT

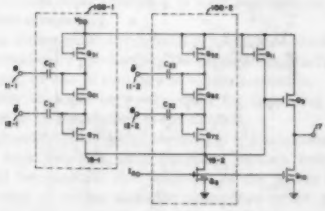
Tojiro Mukawa, and Hatsuhide Igarashi, both of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Feb. 24, 1982, Ser. No. 351,949

Claims priority, application Japan, Feb. 24, 1981, 56-25827

Int. Cl.³ H03K 5/02, 17/10, 17/693; H02M 3/155

U.S. Cl. 307—264 7 Claims



1. A drive circuit comprising a first voltage generating circuit means connected between a first voltage terminal and a voltage output terminal, a second voltage generating circuit means connected between said first voltage terminal and said voltage output terminal, said first voltage generating circuit means having at least a first and a second transistor each operating as a rectification element and being connected in series, a first capacitor connected to a point between said first and second transistors, said second voltage generating circuit means having a third and a fourth transistor each operating as a rectification element and being connected in series, a second capacitor connected to a point between said third and fourth transistors, means for supplying a first clock signal to said first capacitor, means for supplying a second clock signal to said second capacitor, said second clock signal having a phase which is different from the phase of said first clock signal, and a fifth transistor connected between said voltage output terminal and a second voltage terminal for receiving an input signal, whereby an output voltage is derived from said voltage output terminal, when said fifth transistor is made nonconductive, said output voltage being smoothed by said first and second voltage generating circuit means.

4,488,062

PULSE SHAPER

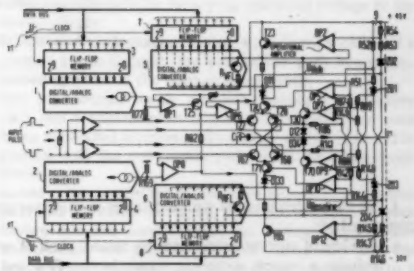
Klaus Welzhofer, Graefelfing, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Continuation of Ser. No. 204,706, Nov. 6, 1980, abandoned. This application Nov. 22, 1982, Ser. No. 443,575

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1979, 2951930

Int. Cl.³ H03K 5/08, 5/12

U.S. Cl. 307—268 12 Claims



1. A pulse shaper comprising:

an input for receiving periodic input pulses;

a data bus for carrying binary signals which define pulses to be formed;

a capacitor to be periodically reversibly charged for forming shaped pulses;

first and second mutually symmetrical circuits connected to reversibly charge said capacitor, said symmetrical circuits connected to said data bus and respectively comprising first and second binarily switched resistance means for setting the rise times and fall times and thereby defining a voltage shift of the pulses to be formed in response to the binary signals, respective first and second constant current sources and respective first and second constant voltage sources connected to and controlled by the respective constant current sources and said first and second binarily switched resistance means for providing a proportional change of the edge steepness with respect to a change of the defined voltage shift of the pulses to be formed, and first and second voltage limitation means connected to said first and second constant voltage sources and including respective variable bias voltage sources for setting bias voltages for said first and second voltage limitation means in accordance with the defined voltage shift of the pulses to be formed; and

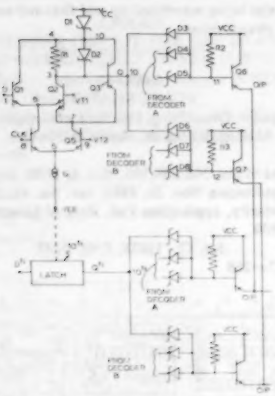
periodically operated differential switching means connected to said input and to said symmetrical circuits and said capacitor and operable in response to the input pulses to connect and disconnect said first and second symmetrical circuits and said capacitor.

4,488,063

EFL LATCH MERGED WITH DECODER-MULTIPLEXER

Shi-Chuan Lee, San Diego, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Continuation of Ser. No. 095,154, Nov. 19, 1979, abandoned.
This application Oct. 13, 1981, Ser. No. 310,381
Int. Cl.³ H03K 3/286, 19/082
U.S. Cl. 307—289 8 Claims



1. An EFL latch merged with a decoder-multiplexer circuit comprised of:

a plurality of current mode latching means, each of which includes a current switching means having first and second inputs and an output for passing a current from said first input to said output to indicate a high voltage state on said first input and for passing a current from said second input to said output to indicate a low voltage state on said first input; wherein the improvement comprises:

a decoder-multiplexer means which includes a first plurality and a second plurality of respective gain elements with each plurality corresponding in number to said plurality of latching means;

each gain element having a base, a collector, and an emitter with its base being coupled to anodes of a respective group of diodes;

one of said diodes in each respective group which is coupled to a respective gain element of said first plurality having a cathode coupled to said current switching means in a respective one of said latching means to detect said voltage state therein, one of said diodes in each respective group which is coupled to a respective gain element of said second plurality having a cathode coupled to said current switching means in said respective one of said latching means to detect said voltage state therein; and cathodes of the remaining diodes being adapted to receive selection signals;

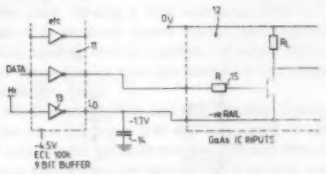
the emitters of all of the gain elements of said first plurality being connected together and the emitters of all of the gain elements of the second plurality being connected together to form respective common outputs for multiplexing said voltage state from a selected one of said latching means in response to all of said selection signals on one group of said diodes being at a high logic level.

4,488,064

INTEGRATED CIRCUIT WITH A COMMON POWER SUPPLY FOR SILICON AND GALLIUM ARSENIDE CIRCUIT PORTIONS

Ian A. W. Vance, Newport, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Aug. 3, 1982, Ser. No. 404,746
Claims priority, application United Kingdom, Aug. 25, 1981, 8125865
Int. Cl.³ H03K 3/013, 19/092, 19/094
U.S. Cl. 307—297 5 Claims



1. A semi-conductor circuit arrangement powered from an electric power supply which provides a predetermined voltage differential, comprising:

a first circuit portion powered from the power supply and including a silicon integrated circuit provided with at least one logic gate having a control input and an output;

a second circuit portion including a gallium arsenide integrated circuit having a reference voltage input connected to the power supply and a power voltage input;

means for applying such an electric potential to said control input as to maintain said logic gate, in use, in its low state; and

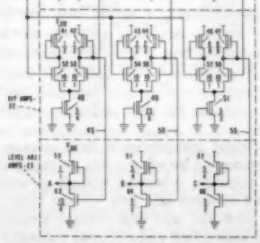
means for coupling said logic gate output to said power supply voltage input, so that, in use, the power supply voltage for the gallium arsenide integrated circuit is derived from the output voltage of said logic gate in its low state.

4,488,065

SENSING AND LOGIC FOR MULTIPLE BIT PER CELL ROM

James H. Doty, II, Springboro, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed Aug. 16, 1982, Ser. No. 408,541
Int. Cl.³ H03K 5/24, 5/153
U.S. Cl. 307—350 10 Claims



1. An impedance comparator, comprising:

a first field effect transistor having the gate and drain electrodes connected to a first node;

means for connecting a first, unknown impedance to said first node;

means for biasing said first field effect transistor with a first voltage source connected through said first impedance;

the second field effect transistor having a defined operational relationship to said first field effect transistor, connected through a second node into conductive series with a second impedance;

means for biasing said second field effect transistor with a second voltage source connected through said second impedance;

means for connecting the gate electrode of said second field effect transistor to the gate electrode of said first field effect transistor; and

means for comparing the amplitude of the voltage on said first node with the amplitude of the voltage on said second node to determine the relative magnitude of said first impedance.

4,488,066

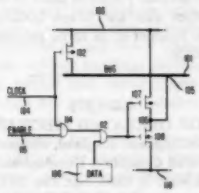
DATABUS COUPLING ARRANGEMENT USING TRANSISTORS OF COMPLEMENTARY CONDUCTIVITY TYPE

Masakazu Shoji, Warren, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 8, 1982, Ser. No. 439,938

Int. Cl.³ H03K *19/017, 19/096*

U.S. Cl. 307—452 **9 Claims**



1. In data processing apparatus, an arrangement for transferring data streams from a plurality of logic networks to a common databus comprising,

a databus means under the control of a source of clock pulses for periodically precharging the databus essentially to the potential of one of two power supply terminals,

a plurality of logic networks, each for supplying a data stream to be transferred to the databus,

and a plurality of coupling networks, one associated with each logic network, each coupling network being connected between the two terminals of the power supply, including an output node for connection to the databus, and supplied with clock pulses and selection pulses whereby the data stream from its associated logic network may be periodically selected for transmission to the databus,

characterized in that the coupling network comprises at least one pair of transistors of complementary conductivity type serially connected between the two terminals of the power supply and in that the node between the two transistors is the output node for connection to the databus.

4,488,067

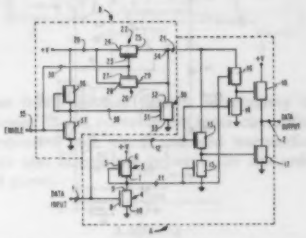
TRISTATE DRIVER CIRCUIT WITH LOW STANDBY POWER CONSUMPTION

Wayne R. Kraft, Coral Springs; Victor S. Moore, Gainesville; William L. Stahl, Jr., Coral Springs, and Nandor G. Thoma, Boca Raton, all of Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 19, 1983, Ser. No. 533,392

Int. Cl.³ H03K *19/094, 19/20, 19/017*

U.S. Cl. 307—473 **10 Claims**



1. Improved tristate control circuitry for a driver circuit formed on an integrated circuit chip comprising:

a voltage supply path for supplying operating voltage to the driver circuit;

a depletion mode transistor having a conduction path and a control electrode with the conduction path being connected in series in the voltage supply path;

a first enhancement mode transistor having a conduction path and a control electrode with the conduction path being connected in series in the voltage supply path and in parallel with the conduction path of the depletion mode transistor;

a second enhancement mode transistor having a conduction path and a control electrode with the conduction path having one end connected to the voltage supply path intermediate the parallel-connected transistors and the driver circuit and having the other end connected to a voltage supply return path; and

binary signal receiving circuitry coupled to the control electrodes of the transistors and responsive to a first binary signal level for reducing conduction in the parallel-connected depletion mode and first enhancement mode transistors and increasing conduction in the second enhancement mode transistor to disable the driver circuit and place same in a high impedance output condition and responsive to a second binary signal level for increasing conduction in the parallel-connected transistors and reducing conduction in the second enhancement mode transistor to enable the driver circuit to pass signals from its input to its output.

4,488,068

BIDIRECTIONAL DRAIN TO DRAIN STACKED FET GATING CIRCUIT

William J. Janutka, West Allis, Wis., assignor to Eaton Corporation, Cleveland, Ohio

Filed Sep. 28, 1982, Ser. No. 425,156

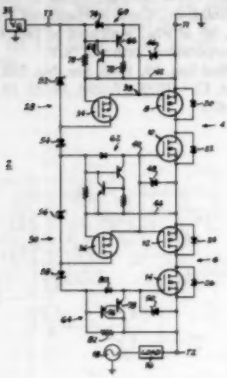
Int. Cl.³ H03K *17/08, 17/10, 17/687*

U.S. Cl. 307—570 **12 Claims**

1. A bidirectional FET circuit comprising:

a plurality of pairs of enhancement mode power FETs, each pair comprising first and second FETs of like channel type connected drain to drain in series relation, said pairs connected in series between first and second main power terminals, current conduction in one direction flowing through the series connection of the forward biased substrate-drain PN junction of said first FET and the drain-source current path of said second FET, and in the oppo-

site direction through the series connection of the forward biased substrate-drain PN junction of said second FET and the drain-source current path of said first FET; and



a plurality of gating circuits, one gating circuit for each said pair of power FETs for driving the latter into conduction.

4,488,069

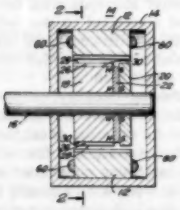
STEPPING MOTOR

John H. Field, II, Medfield, Mass., assignor to Sigma Instruments Inc., Braintree, Mass.

Continuation of Ser. No. 251,761, Apr. 7, 1981, abandoned. This application Aug. 10, 1983, Ser. No. 522,244

Int. Cl.³ H02K *37/00*

U.S. Cl. 310—49 A **9 Claims**



1. A synchronous motor comprising:

a stator and a rotor movable relative to each other about a common axis;

said stator having a plurality of stator poles;

said poles having a plurality of radially directed stator teeth arranged in a circle around the axis;

said rotor having a plurality of rotor teeth arranged about the axis;

a permanent magnet for continuously magnetizing said rotor and producing magnetic fields in the rotor;

winding means on said poles for inducing magnetic fields in said poles in radial directions so as to interact with magnetic fields in the rotor and rotate the rotor;

said rotor hvaing a first axial portion and a second axial portion with said permanent magnet located between them and axially magnetizing said portions with opposite polarities;

said first portion having said plurality of rotor teeth extending axially along the entire periphery of the first portion all magnetized with one polarity of the magnet;

said second portion having a substantially toothless cylindrical surface extending along substantially the entire axial length of the second portion and being entirely magnetized with the opposite polarity of the magent.

4,488,070

ALTERNATING CURRENT GENERATOR FOR A CAR HAVING A MULTI PART PARTITION PLATE FOR AIDING A COOLING FAN

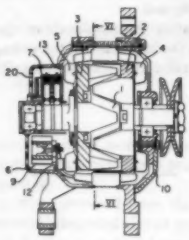
Yoshiyuki Iwaki, Himeji; Hideo Imori, Hyogo, and Hitoshi Gotou, Himeji, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 30, 1983, Ser. No. 556,601

Claims priority, application Japan, Nov. 30, 1982, 57-182818[U]

Int. Cl.³ H02K *9/00*

U.S. Cl. 310—62 **5 Claims**



1. An alternating current generator for cars having a partition plate structure which comprises a blade attached to an outer surface of magnetic poles clamping a field coil and a rear bracket holding a rectifier and a brush holder at its bottom portion, wherein an inner part of said rear bracket is inwardly extended in the radial direction to provide an extended surface so as to face said blade with a predetermined distance in an area where said rectifier and said brush holder are not placed; a first partition plate to be fastened to said rear bracket together with said rectifier and a second partition plate to be fastened to said rear bracket together with said brush holder are respectively placed in said rear bracket so as to be substantially flush with said extended surface.

4,488,071

MOTOR OPERATED MECHANISM

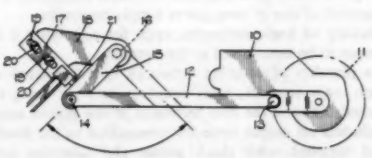
Robert J. Lane, Birmingham, England, assignor to Lucas Industries Public Limited Company, Birmingham, England

Filed Mar. 7, 1984, Ser. No. 587,126

Claims priority, application United Kingdom, Mar. 11, 1983, 8306690

Int. Cl.³ H02K *5/26*

U.S. Cl. 310—68 B **12 Claims**



8. A motor operated mechanism including a motor, a support, a member movable relative to the support, means connecting the member to the motor so that operation of the motor causes movement of the member towards and away from a limit position, an abutment for engagement by said member in said limit position for preventing movement of said member beyond said limit position, and mounting means

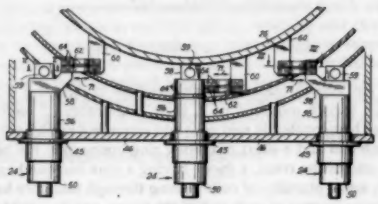
mounting said abutment on said support for movement by the member from an initial position to a set position, said mounting means providing a frictional resistance to said movement of the member such that the force required to overcome the frictional resistance is less than the force which is capable of being applied to the abutment by the motor via the member.

4,488,072

GENERATOR STATOR FRAME WITH INTEGRAL HIGH-VOLTAGE BUSHINGS

James B. Archibald, and Frederick J. Rink, Jr., both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jun. 8, 1983, Ser. No. 502,085
Int. Cl.³ H02K *11/00*
U.S. Cl. 310—71 **5 Claims**



1. An electric generator of the type having a rotor and a stator, comprising:

a stator frame enclosing said stator, said stator frame having a bottom surface;

said stator including connector rings connected to armature bars of phase windings of said stator;

a terminal plate assembly permanently affixed to said bottom surface below said connector rings;

a plurality of high-voltage bushings;

means for sealingly installing said plurality of high-voltage bushings in said terminal plate assembly;

said means for sealingly installing including means for permitting removal of said plurality of high-voltage bushings at least for shipment of said stator frame;

each of said high-voltage bushings including an inner portion disposed within said stator frame when said high voltage bushings are sealingly installed in said terminal plate assembly;

said inner portions each including a connecting portion;

at least one conducting bar extending from each one of said connector rings to a position tangentially spaced from one of said connecting portions; and

flexible connecting means tangentially disposed with respect to said connector rings for connecting an end of each of said conducting bars to its respective tangentially spaced connecting portion.

4,488,073

STARTER WITH MAGNET TYPE D.C. MOTOR

Akira Morishita, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

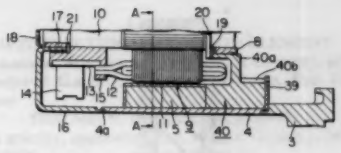
Filed Jan. 18, 1983, Ser. No. 458,933
Claims priority, application Japan, Jan. 27, 1982, 57-10445[U]
Int. Cl.³ H02K *5/10*
U.S. Cl. 310—83 **3 Claims**

1. A starter comprising:

a magnet type D.C. motor which includes a generally cylindrical yoke, a plurality of fixed poles comprising permanent magnet pole pieces fastened to the inside of said yoke at circumferentially spaced locations, and a rotary armature arranged in opposition to said poles,

planetary reduction gears which are provided at an end part of an output shaft of said rotary armature, and

an integral intermediate frame member which is fastened to said yoke; which includes a shaft supporting portion for supporting said output shaft of said rotary armature through a sleeve bearing, and a ring gear portion cooperating with said planetary reduction gears; and said intermediate frame member further surrounding the outer peripheries of and covering the inner circumferences of the respective pole pieces and said intermediate frame member also intervening between the circumferentially spaced pieces.

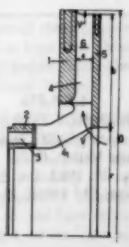


4,488,074

LOW POWER CONSUMPTION ELECTROMAGNETIC RETARDER ARMATURE ROTOR

André Marandet, Saint Gratien, France, assignor to Labavia S.G.E., Bois D'Arcy, France

Filed Sep. 27, 1982, Ser. No. 425,070
Claims priority, application France, Oct. 28, 1981, 81 20261
Int. Cl.³ H02K *49/00*
U.S. Cl. 310—93 **5 Claims**



1. An electromagnetic retarder armature rotor, comprising a disk (1) connected to a securing collar (2) by means of a ring of arms (4, 4_1) forming ventilation fins, the largest diameter portions of these arms projecting axially from the disk and their tops being connected together by an annular flange (5) parallel to the disk, the assembly of the disk, the collar, the arms and the flange forming a single molded block in which the outer diameter of the disk (1) D, the axial distance between this disk (1) and the flange (5) a, the radial width of this flange (5) b and the inner radius of said flange (5) r, are related such that the ratio Db/ar is between 10 and 30.

4,488,075

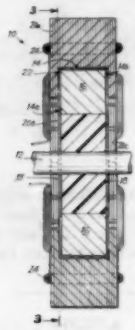
ALTERNATOR WITH ROTOR AXIAL FLUX EXCITATION

Dominic DeCesare, 223 Center St., Elizabeth, N.J. 07202

Filed Oct. 26, 1981, Ser. No. 315,260
Int. Cl.³ H02K *21/12*
U.S. Cl. 310—156 **25 Claims**

1. An alternator comprising a driver shaft; a disc-like rotor mounted on said shaft for rotation therewith and having peripheral and axial surfaces, said rotor incorporating a plurality of alternating magnetic poles each of which establishes a three sided excitation magnetic flux field at the peripheral surface and at both axial surfaces of said rotor; and a stator including

armature coils distributed about substantially central portion of said stator and arranged proximate to said rotor to magnetically couple with the flux at said peripheral and axial surfaces to thereby enhance voltage induction, wherein said stator includes said central portion spaced proximate to said rotor



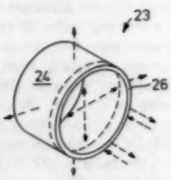
peripheral surface, and axial radially directed substantially flat wall portions proximate to and in opposed relationship to respective ones of said rotor axial surfaces, said axial wall portions causing the flux at said rotor axial surfaces to be coupled to said armature coils by means of said stator axial wall portions.

4,488,076

TACHOMETER ASSEMBLY FOR MAGNETIC MOTORS

Donald J. MacCleod, Aptos, Calif., assignor to Applied Motion Products, Inc., Scotts Valley, Calif.

Filed Sep. 30, 1982, Ser. No. 429,076
Int. Cl.[3] H02K *21/12*
U.S. Cl. 310—171 15 Claims



7. In a magnetic tachometer assembly attached to a brushless direct current motor including a radially polarized cylindrical main field magnet and magnetic sensing means adapted for delivery to analyzing means for determining the rotational velocity of the motor by analog methods, the improvement comprising:

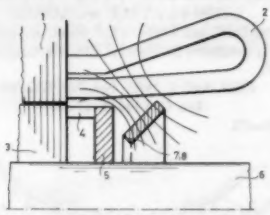
magnetizing a planar ring portion of the main field magnet, the ring portion being coaxial with and arrayed in a plane parallel to the plane of the sensing means and separated therefrom by an axial air gap, to include a plurality of alternately polarized sectors, with each said sector being equivalent in size and shape and each being axially polarized with the opposite polarization to each adjacent sector.

4,488,077

ASYNCHRONOUS MACHINE WITH STARTING DISC

Gábor Kovács, Budapest, Hungary, assignor to Ganz Villamossagi Müvek, Budapest, Hungary

Filed Dec. 3, 1981, Ser. No. 327,170
Claims priority, application Hungary, Dec. 30, 1980, 3151/80
Int. Cl.[3] H02K *17/18*
U.S. Cl. 310—212 9 Claims



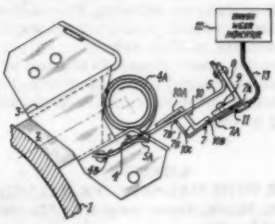
1. An asynchronous electric machine comprising a rotor having a core mounted on a shaft, a plurality of uniformly spaced bars located in said core and extending axially outward at each end and a short circuiting ring connecting the bars at each end of the rotor, a stator having a core surrounding said rotor, and a plurality of coils passing through said core having end turns located at each end of the stator, axially outside said short circuiting ring, means for producing a high torque between said rotor and stator comprising at least one annular conductive body mounted about said shaft at at least one end of said rotor for conjoint rotation therewith, said annular conductive body lying spaced from and axially between said short circuiting ring and said end turns and radially between said coils and said shaft, said annular conductive body lying within the common stray magnetic field of the end turns and the short circuiting ring at the respective end of said rotor and being of sufficient size to produce considerable flux loss therein.

4,488,078

BRUSH WEAR DETECTOR

Ronald C. Orton, Erie, Pa., assignor to General Electric Company, Erie, Pa.

Filed Aug. 18, 1982, Ser. No. 409,234
Int. Cl.[3] H02K *13/00*
U.S. Cl. 310—242 4 Claims



1. A brush wear detector for a dynamoelectric machine having a brushholder, a brush disposed within said holder, a brush-biasing spring mounted with one of its ends fixed to and supported by an electrically conductive brush-biasing spring support, and means for mounting said spring support on the brushholder in an operating position wherein a coiled portion of the spring acts to bias the brush against an electrically conductive component of said machine and the spring is held in electrically conductive relationship with the brush and the spring support, said brush wear detector comprising:

(a) an electricaily conductive leaf spring, having one of its

ends mounted in fixed relationship to a first dielectric member and having its other end free to move, said first dielectric member being effective to insulate the leaf spring from the brush-biasing spring support,

(b) a second dielectric member secured to a portion of said leaf spring between said ends thereof, said second dielectric member being arranged to project outward from the leaf spring to engage an uncoiled portion of the brush-biasing spring when the brush-biasing spring is extended a predetermined length, thereby positioning said second dielectric member to hold the free end of the leaf spring disengaged from the brush-biasing spring support,

(c) said leaf spring being effective to move its free end into electrically conductive engagement with said spring support responsive to the brush-biasing spring winding up as a pre-determined degree of brush wear occurs, thereby to move said uncoiled portion of said brush-biasing spring in a direction away from said second dielectric member, and

(d) terminal means for electrically connecting a brush wear indicating circuit to said leaf spring, whereby said circuit can be electrically disconnected from the spring support responsive to the brush-biasing spring being extended to at least said predetermined length, and whereby said circuit is electrically energized through the leaf spring responsive to the occurrence of said predetermined degree of wear of the brush and the resultant engagement of the leaf spring with the brush-biasing spring support.

4,488,079

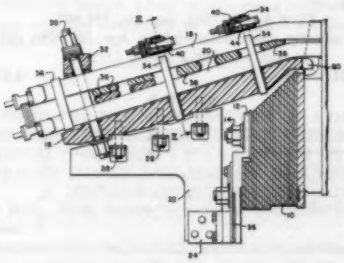
DYNAMOELECTRIC MACHINE WITH STATOR COIL END TURN SUPPORT SYSTEM

George F. Dailey, and Homer W. Luzader, both of Plum, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 30, 1984, Ser. No. 595,025

Int. Cl.³ H02K *3/46*

U.S. Cl. 310—260 **3 Claims**



1. A stator coil end turn support system comprising in combination:

stator coil end turns including a top coil and a bottom coil extending axially from slots in a stator core with extremities of said end turns radially outward from said slots;

a conical support member containing said end turns therein and configured to fit closely adjacent and radially outside said bottom coils;

means for securely fastening one of said top coils and one of said bottom coils together with said conical support member comprising banding, at at least one location intermediate the length of an end turn, extending through apertures in said conical support member and around both said top and bottom coils;

said banding passing over a banding adjustment means on the inner surface of said end turns, said banding adjustment device permitting tightening of said banding in both original manufacture and in field operation and comprising an adjusting ring fitting under the top coil of said end turn and having a portion extending away from said top coil with an aperture in said extending portion, a wedge extending through said aperture with a fastener thereon, a banding block on the side of said wedge away from said top coil, said banding being located on a surface of said banding block away from said coil and fastener means for drawing said wedge into said aperture of said adjusting ring extending portion to tighten said banding.

4,488,080

PIEZOELECTRICAL CONTROL ELEMENT

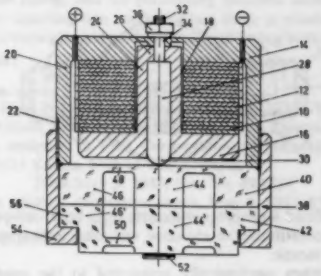
Rainer Baumann, Bruchkoebel, Fed. Rep. of Germany, assignor to Honeywell G.m.b.H., Frankfurt am Main, Fed. Rep. of Germany

Filed May 9, 1983, Ser. No. 492,980

Claims priority, application Fed. Rep. of Germany, May 17, 1982, 3218576

Int. Cl.³ H01L *41/08*

U.S. Cl. 310—328 **7 Claims**



1. A piezoelectrical control element comprising:

a loosely piled stack of at least two piezoelectrical elements and intermediately arranged electrodes, said stack having a central passing through recess;

base plate means;

back-pressure plate means having a central portion extending through said central passing through recess;

said stack sandwiched between said base plate means and said back-pressure plate means;

resilient means for displaceably biasing said back-pressure plate means relative to said base means; and

coupling means having a curved end portion abutting said resilient means for coupling said back-pressure plate means and said resilient means.

4,488,081

IGNITION PLUG

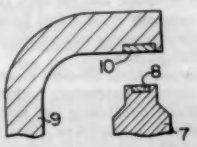
Ryoji Kondo, Okazaki; Kanji Higuchi, Hekinan; Kozo Takamura, Nagoya; Yasuyuki Sato, Kasugai, and Minoru Nagai, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Sep. 29, 1982, Ser. No. 427,820

Claims priority, application Japan, Oct. 1, 1981, 56-156840

Int. Cl.³ H01T *13/20*

U.S. Cl. 313—141 **1 Claim**



1. An ignition plug in which (1) a Pt-Ir noble metal layer containing about 15 to 30% by weight of Ir and the remainder

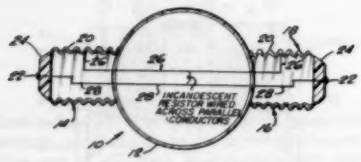
of Pt based on the total of Pt and Ir is joined to the spark discharge portion of a center electrode at least using a nickel-containing metal as a base metal, and (2) a Pt-Ni noble metal layer containing about 15 to 30% by weight of Ni and the remainder of Pt based on the total of Pt and Ni is joined to the spark discharge portion of a ground electrode at least using a nickel-containing metal as a base metal.

4,488,082

BI-FITTED INCANDESCENT ELECTRIC LIGHT BULBS WITH INTERNAL ELECTRICALLY PARALLEL CONDUCTORS

Millard Cummins, Columbus, Ohio, assignor to Invocas, Inc., Columbus, Ohio

Filed Jan. 21, 1983, Ser. No. 459,982
Int. Cl.³ H01J *5/48, 5/50*
U.S. Cl. 313—318 **22 Claims**



1. A bifitted incandescent electric light bulb, comprising:
means constituting an envelope including light-transmitting wall means;
two fittings mechanically connected to the envelope as externally accessable accoutrements thereof, said two fittings being spaced from one another about the periphery of the envelope;
each fitting including a first and a second electrical terminal and dielectric means electrically insulating these terminals from one another;
two electrical conductors respectively wired in parallel within said envelope one between corresponding first electrical terminals of said two fittings and the other between corresponding second electrical terminals of said two fittings; and
at least one incandescent filament means provided across said two electrical conductors within said envelope.

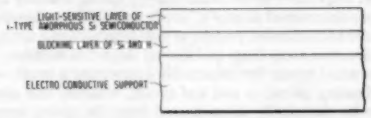
7. A lighting system of bifitted incandescent electric light bulbs, comprising:
at least two adjoining bifitted incandescent electric light bulbs, each including:
means constituting an envelope including light-transmitting wall means;
two fittings mechanically connected to the envelope as externally accessable accoutrements thereof, said two fittings being spaced from one another about the periphery of the envelope;
each fitting including a first and a second electrical terminal and dielectric means electrically insulating these terminals from one another;
two electrical conductors respectively wired in parallel within said envelope one between corresponding first electrical terminals of said two fittings and the other between corresponding second electrical terminals of said two fittings; and
at least one incandescent filament means provided across said two electrical conductors within said envelope;
means mechanically connecting one said fitting of one of said light bulbs to a respective other said fitting of the other of said light bulbs with the corresponding first electrical terminals of the one and other said fittings of said one and other light bulbs being electrically connected to one another and with the corresponding second electrical terminals of the one and other said fittings of said one and other light bulbs being electrically connected to one another.

4,488,083

TELEVISION CAMERA TUBE USING LIGHT-SENSITIVE LAYER COMPOSED OF AMORPHOUS SILICON

Eiichi Inoue, Tokyo, and Isamu Shimizu, Kanagawa, both of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 30, 1981, Ser. No. 259,221
Claims priority, application Japan, Apr. 30, 1980, 55-57587
Int. Cl.³ H01J *31/38*
U.S. Cl. 313—366 **17 Claims**



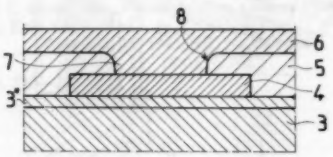
1. A television camera tube using a target which comprises an electrically-conductive support, a blocking layer composed of an n-type amorphous silicon semiconductor consisting essentially of silicon and hydrogen, provided on the electrically-conductive layer, and a light-sensitive layer composed of an i-type amorphous silicon semiconductor having a conductivity of not more than 10^{-8} $(\Omega\ cm)^{-1}$, provided on the blocking layer.

4,488,084

ELECTROLUMINESCENCE STRUCTURE

Sven G. Lindfors; Jorma O. Antson, both of Espoo; Ralf Graeffe, Porvoo; Arto J. Pakkala, Evitskog, and Tuomo S. Suntola, Espoo, all of Finland, assignors to Oy Lohja Ab, Virkkala, Finland

Filed Apr. 6, 1981, Ser. No. 251,087
Claims priority, application Finland, Apr. 24, 1980, 801318
Int. Cl.³ H01J *29/28, 1/70*
U.S. Cl. 313—506 **4 Claims**



1. An electroluminescence structure comprising:
(a) at least one transparent substrate made of, e.g., glass;
(b) at least one first transparent electrode layer disposed on the substrate;
(c) a luminescence layer disposed on the first electrode layer and extending in the lateral direction to cover the said first electrode layer;
(d) at least one second transparent electrode layer disposed at least partially on the luminescence layer;
(e) at least one black layer having at least one insulating portion covering at least opposite edge areas of the second electrode layer and reaching, in the lateral direction, beyond the second electrode layer so as to directly contact the luminescence layer outside of said second electrode layer; and
(f) wiring disposed on said insulating portion, wherein at least one opening reaching the second electrode layer is formed in the insulating portion opposite said second electrode layer such that the wiring can make electrical

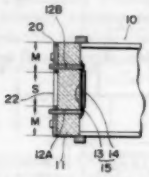
contact with the second electrode layer through the opening.

4,488,085

IMAGE PICK-UP TUBE ARRANGEMENT

Takashi Nakamura; Yoshihiro Morioka, and Hiroyuki Sugimoto, all of Atsugi, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 22, 1982, Ser. No. 360,436
Claims priority, application Japan, Mar. 31, 1981, 56-45506[U]
Int. Cl.³ H01J *23/16, 29/96*
U.S. Cl. 315—3 **5 Claims**



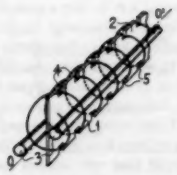
1. A photoconductive type image pick-up tube comprising; a signal deriving target electrode through a face plate glass of the image pick-up tube and connected to a transparent electrode mounted in the inside of the pick-up tube, an electron gun mounted in said pick-up tube for scanning said target electrode, a printed circuit board having an aperture corresponding to the effective area of said image pick-up tube and mounted on said face plate glass on the outside of said pick-up tube, components of a first stage amplifier mounted on said printed circuit board, said components including at least an active transister device, a load resistor and a feedback resistor and said amplifier connected to said signal deriving target electrode.

4,488,086

METHOD FOR THE MANUFACTURE OF A DEVICE ENSURING AN ELECTRICAL AND THERMAL CONTACT BETWEEN A PLURALITY OF METAL SURFACES, DEVICE OBTAINED BY THIS METHOD, AND USE OF SAID DEVICE

Roger Hoet, Paris, France, assignor to Thomson-CSF, Paris, France

Continuation of Ser. No. 115,023, Jan. 24, 1980, abandoned. This application Jan. 28, 1983, Ser. No. 462,106
Claims priority, application France, Jan. 30, 1979, 79 02282
Int. Cl.³ H01J *7/46, 19/80*
U.S. Cl. 315—39 **31 Claims**



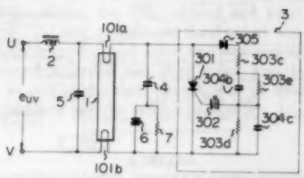
1. In a microwave electronic device comprising,
(a) at least two conductive surfaces spaced apart from each other;
(b) a substantially helical winding of at least one metal wire, each of several turns of said winding having in a plane perpendicular to the helix axis abrupt bends at two different locations and thus each of said turns having a substantially non circular shape;
(c) a fitting comprising a flexible strip coinciding with the axis of said substantially helical winding, said fitting comprising two rows of slots made on two opposite edges of the fitting and the metal wire passing in said slots, said wire having said two abrupt bends at the slots of the fitting to prevent the wire from moving relative to the fitting when said helical winding is moved relative to said surfaces;
(d) said winding and said fitting being positioned between said surfaces in touching contact therewith, and providing good electrical and thermal contact between said winding and said surfaces at different positions of said surfaces; said surfaces and said fitting with winding being adapted for relative movement therebetween; said bends and slots preventing the wire from moving and from sliding around in the fitting, and for preventing different turns of wire from touching one another when there is relative movement between said surfaces and said fitting with winding.

4,488,087

DISCHARGE LAMP LIGHTING DEVICE

Hiromi Adachi, Kamakura, and Shoichi Iwaya, Kisagata, both of Japan, assignors to TDK Corporation and Mitsubishi Denki Kabushiki Kaisha, both of Tokyo, Japan

Filed May 5, 1983, Ser. No. 492,017
Claims priority, application Japan, May 6, 1982, 57-76091
Int. Cl.³ H05B *39/00*
U.S. Cl. 315—101 **6 Claims**



1. A discharge lamp lighting device comprising;
a discharge lamp with a pair of filaments coupled with a power supply through an inductive balast,
a non-linear dielectric element coupled between said filaments,
a semiconductor switch coupled parallel with said non-linear dielectric element, said semiconductor switch closing at some phase of a power supply voltage, and
delay means for gradually increasing a positive voltage across said non-linear dielectric element.

4,488,088

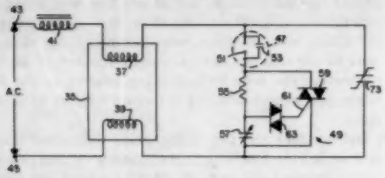
STARTER CIRCUIT FOR LAMPS WITH HIGH REIGNITION VOLTAGES

Fredrick W. Paget, Rockport, Mass., assignor to GTE Products Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 385,637, Jun. 7, 1982, abandoned. This application Mar. 1, 1984, Ser. No. 584,292
Int. Cl.³ H05B *39/00*
U.S. Cl. 315—101 **11 Claims**

1. A fluorescent lamp starting circuit comprising:
a glow starter coupled to said fluorescent lamp;
means coupled to said fluorescent lamp for developing a lamp voltage having a portion thereof greater than and a portion less than the ionizing voltage of said glow starter; and
a timing and triggering circuit means connected in series with said glow starter and shunting said fluorescent lamp

to provide application of said lamp voltage portion less than said ionizing voltage to said glow starter whereby



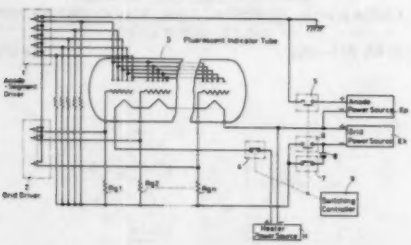
reignition of said glow starter is prohibited during lamp operation.

4,488,089

FLUORESCENT INDICATOR TUBE DRIVING CIRCUIT

Minoru Shota, Higashiosaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 17, 1983, Ser. No. 467,291
Claims priority, application Japan, Feb. 19, 1982, 57-26652
Int. Cl.³ H05B *39/00, 41/36*
U.S. Cl. 315—106 **4 Claims**



1. A circuit for driving a multielement fluorescent indicator tube having at least two heaters, a grid and an anode comprising:

means for periodically applying a direct current heater voltage to said heaters;

means for developing a display from said fluorescent indicator tube by applying an anode voltage between said anode and a said heater and a grid voltage between said grid and a said heater;

means for inhibiting said means for developing during application of said direct current heater voltage to said heaters by said means for periodically applying to inhibit variations in display brightness between elements of said tube;

first means for delaying the development of said grid voltage by said means for developing until after completion of the application of said direct current heater voltage to said heaters by said means for periodically applying; and

second means for delaying the development of said anode voltage by said means for developing until a predetermined time after said grid voltage is fully developed thereby.

4,488,090

ADVERTISING SIGN SYSTEM

Bruce J. Hancock, Mesa, Ariz., assignor to Jack Hodson, Glendale, Ariz.

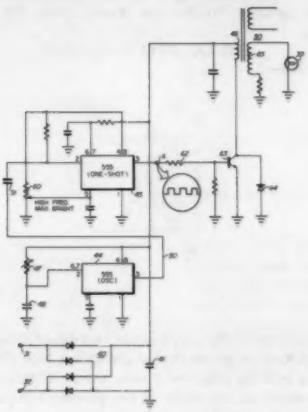
Filed Sep. 7, 1982, Ser. No. 415,743
Int. Cl.³ H05B *37/00*
U.S. Cl. 315—201 **13 Claims**

1. A low-voltage system for operating a high-voltage light tube in an advertising sign attached to the outer wall of a building including in combination;

an advertising sign housing attached to the outside wall of a building and having a high-voltage light tube mounted therein;

a source of household alternating current located within the building on which said advertising sign housing is mounted;

first means located within the building and coupled to said



source of household current for producing a low-voltage output;

a low-voltage to high-voltage conversion means located within said housing and having an input and an output, said output connected to said high-voltage light tube for supplying high frequency, high-voltage operating current thereto; and

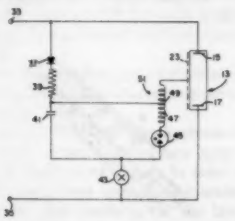
means for interconnecting the output of said first means with the input of said low-voltage to high-voltage conversion means through the wall of the building.

4,488,091

HIGH INTENSITY DISCHARGE LAMP

Martin E. Muzeroll, Merrimack, N.H.; Robert Bonazoli, Hamilton; John F. Waymouth, Marblehead, both of Mass., and Robert J. Karlotski, Weare, N.H., assignors to GTE Products Corporation, Stamford, Conn.

Filed Nov. 12, 1982, Ser. No. 440,907
Int. Cl.³ H05B *41/16*
U.S. Cl. 315—268 **8 Claims**



1. A high intensity discharge lamp operated from an associated AC potential source comprising:

a sealed outer envelope;

a sealed arc tube disposed within said envelope, said arc tube containing an arc sustaining fill gas and having an elec-

trode sealed into each end thereof and passing through said outer envelope;

a starting probe positioned adjacent said arc tube and passing through said outer envelope;

a base member affixed to said outer envelope; and

a circuit means including a series-connected unidirectional conduction device and capacitor shunting said AC potential source and said electrodes of said arc tube with said unidirectional conduction device connected to one side of said A.C. source and poled to provide conduction to said capacitor only on the positive going half cycle at said side, a series-connected surge arrestor and primary winding of a transformer shunting said capacitor with one electrode of the surge arrestor connected to the other side of the A.C. line, and a secondary winding of said transformer coupling said primary winding to said starting probe whereby photoelectric negative charging of said arc tube and ionic current flow therethrough is inhibited.

4,488,092

ILLUMINATION MODE SELECTING DEVICE FOR ILLUMINATION LAMP

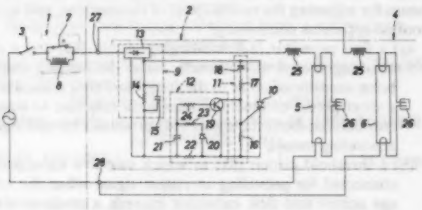
Toichi Chikuma, 11-9-703,Sendagaya 4 Chome, Shibuya-ku, Tokyo, Japan 151

Filed Jun. 18, 1982, Ser. No. 390,078

Claims priority, application Japan, Jul. 21, 1981, 56-108243[U]; Mar. 5, 1982, 57-33797; Mar. 8, 1982, 57-35081

Int. Cl.[3] **H05B** *41/38*

U.S. Cl. 315—324 **3 Claims**



1. An illumination mode selection device for an illumination lamp system including a plurality of illumination elements connected in parallel to an A.C. power source, comprising:

a power switch;

a mode selecting means having one terminal connected to said power switch and having another terminal connected to one terminal of a preselected number of said plurality of illumination elements, said mode selecting means having an impedance which is selectively changeable between a high value and a low value;

a rectifier means having a pair of A.C. input terminals and a pair of D.C. output terminals, one of said A.C. input terminals being connected to said another terminal of said mode selecting means and the other of said pair of A.C. input terminals being connected to at least one of said plurality of illumination elements; and

a control circuit connected between said D.C. output terminals of said rectifier means, said control circuit including a thyristor, a load resistor for said thyristor, an ignition circuit for said thyristor to ignite said thyristor when an A.C. input voltage is applied to said pair of A.C. input terminals of said rectifier means and a timer circuit for prohibiting said thyristor from being turned-on for a predetermined period of time after said impedance of said mode selecting means is changed from said high value to said low value.

4,488,093

COLOR SHADOW MASK CATHODE RAY TUBES

Doug Haines, Mulino; Keith Taylor, and Murian Kaufman, both of Portland, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

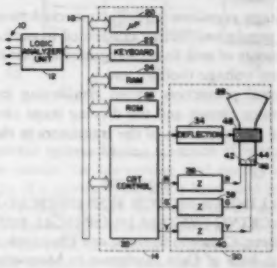
PCT No. PCT/US82/00406, § 371 Date Oct. 1, 1982, § 102(e) Date Oct. 1, 1982, PCT Pub. No. WO82/03494, PCT Pub. Date Oct. 14, 1982

Pub. Date Mar. 30, 1982, Ser. No. 456,932

Claims priority, application Japan, Mar. 31, 1981, 56-48312

Int. Cl.[3] **H01J** *29/80*

U.S. Cl. 315—375 **5 Claims**



1. A color shadow mask cathode ray tube having a faceplate upon the back of which are deposited arrays of first, second and third phosphors which radiate first, second and third colors respectively when irradiated by electrons, and first, second and third electron guns for providing beams of electrons for irradiating the first, second and third phosphors respectively, the first, second and third colors being such that said third color is produced when said first and second colors are combined, whereby said third color may be produced either by irradiating the third phosphor or by irradiating both the first phosphor and the second phosphor.

4,488,094

LINEAR INTEGRATED CIRCUIT FOR DRIVING A D.C. MOTOR WITH RADIO CONTROL

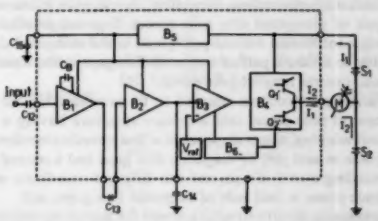
Sung K. Min, Incheon; Bang W. Lee, Bucheon, and Doo H. Choi, Seoul, all of Rep. of Korea, assignors to Samsung Semiconductor & Telecommunications Company, Ltd., Rep. of Korea

Filed Apr. 6, 1983, Ser. No. 482,411

Claims priority, application Rep. of Korea, Oct. 30, 1982, 82-4922

Int. Cl.[3] **H04Q** *7/02*

U.S. Cl. 318—16 **4 Claims**



1. A linear integrated circuit for a motorized receiver unit which receives from a transmitter unit certain radio signals for driving and for reversing the rotational direction of the d.c. motor of said motorized receiver unit, wherein said linear integrated circuit is powered from an external power supply associated with said motorized receiver unit and includes the following components:

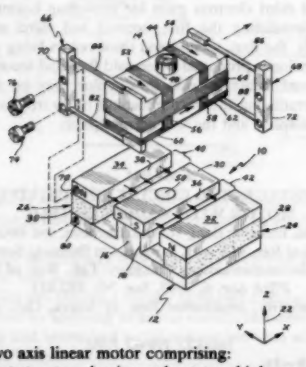
(a) an amplifier connectable to the output of the front-end (carrier receiver) section of said motorized receiver unit for amplifying its input signal, which is the transmitted motor command signal relating to rotational direction;
(b) a peak detector connected to the output of said amplifier and arranged to respond to the peak amplitude of the amplified input signal;
(c) a comparator coupled to the output of said peak detector and arranged to produce one or two signals corresponding to the direction of rotation of said d.c. motor;
(d) a driving stage circuit coupled to and responsive to said comparator so as to drive said d.c. motor in one direction or the other;
(e) a voltage regulator circuit connected to said external power supply and further connected to each of the above components of said linear integrated circuit for supplying stabilized voltage thereto; and
(f) a thermal protection circuit connecting in-parallel the comparator circuit and the driving stage circuit so as to stabilize the operation of the transistors in the latter.

4,488,095

TWO AXIS LINEAR MOTOR FOR OPTICAL FOCUSING AND TRACKING SYSTEM IN OPTICAL RECORDING

Thomas E. Berg, Colorado Springs, and Christopher A. Pollard, Monument, both of Colo., assignors to Magnetic Peripherals Inc., Minneapolis, Minn.

Filed Dec. 9, 1982, Ser. No. 448,130
Int. Cl.³ H02K *41/02*
U.S. Cl. 318—38 **34 Claims**



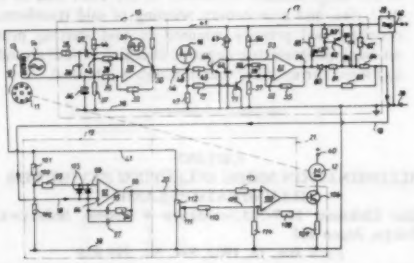
1. A two axis linear motor comprising:
a magnet structure having at least two high energy permanent magnets and an elongated central pole piece and a pair of elongated side pole pieces disposed parallel and adjacent to said central pole piece in the elongated direction to create a pair of magnetic flux gaps with respect to said central magnet pole piece,
an armature structure adapted to fit over and around said central pole piece, said armature structure having a first coil winding means disposed in a first coordinate reference plane in said pair of magnetic flux gaps and a second coil winding means in a second and different coordinate reference plane in said pair of magnetic flux gaps, and
a suspension flexure structure means for mounting said armature structure to said magnet structure for movement in two directions, the first direction perpendicular to said first coordinate reference plane and the second direction perpendicular to said second reference plane, said suspension flexure structure means supporting said armature structure against undesired rotations and translations while allowing the first and second movements with respect to said magnet structure.

4,488,096

SPEED CONTROL FOR A ROTARY MACHINE

Hinrich Cap, St. Georgen Peterzell; Johann von der Heide, Mönchweiler, and Rolf Müller, St. Georgen, all of Fed. Rep. of Germany, assignors to Papst-Motoren GmbH & Co. KG, St. Georgen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 195,862, Oct. 10, 1980, Pat. No. 4,337,424. This application Aug. 27, 1981, Ser. No. 296,861
Claims priority, application Switzerland, Apr. 16, 1980, 2931/80
The portion of the term of this patent subsequent to Jun. 29, 1999, has been disclaimed.
Int. Cl.³ H02P *5/16*
U.S. Cl. 318—328 **11 Claims**



1. Speed control apparatus for a rotary machine having a signal generating means for producing a signal of a frequency proportional to rotary speed and having also torque varying means for adjusting the rotary speed of the machine, said speed control apparatus comprising:
(a) a first capacitor (**62**), a charging circuit (**63**) and a discharging circuit (**64**) therefor, said discharging circuit being constituted so as to discharge said first capacitor in a short period of time periodically in response to signals (**16**) derived from the signal (**14**) produced by said signal generating means;
(b) a threshold circuit (**51**) to which said first capacitor is connected for providing an output signal when the voltage across said first capacitor exceeds a predetermined value;
(c) a second capacitor (**83, 123,783**) connected so that its charge condition is controlled by said output signal of said threshold circuit;
(d) a discharging resistor (**183, 127', 783^xx**) in parallel to the second capacitor for discharging the same to prevent excessive speeds of rotation;
(e) means (**19,20**) responsive to the voltage across said second capacitor for actuating said torque varying means of said rotary machine;
(f) active normalizing circuit means (**82; 127**) connected to said second capacitor.

4,488,097

ELECTRIC MOTOR ROTATION POSITION CONTROL DEVICE

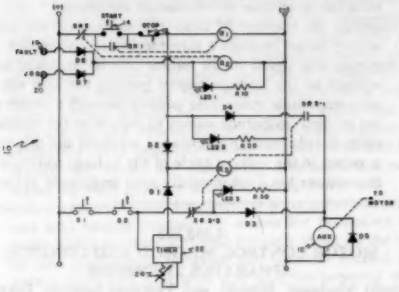
Donald N. MacLaughlin, Midland, Mich., assignor to Cosden Technology, Inc., Dallas, Tex.

Filed Apr. 21, 1983, Ser. No. 487,410
Int. Cl.³ H02P *1/10*
U.S. Cl. 318—443 **30 Claims**

1. A rotation control circuit comprising:
a power supply;
a motor relay operable to be energized by said power supply;
a circuit for intermittently energizing said motor relay comprising:
a first switch means, connected to said power supply;
a second switch means for connecting said first switch means

to said motor relay, said second switch means being normally closed;

a timer connected to said first switch means and operable, in response to the closing of said first switch means, to generate a time delayed signal having a predetermined time delay, said time delayed signal being operable to open said



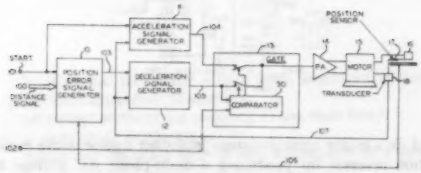
second switch means thereby energizing said motor relay in response to each closing of said first switch means for a period corresponding to said predetermined time delay regardless of whether said first switch means is closed for a period of time greater than said predetermined time delay.

4,488,098

POSITION CONTROL SYSTEM FOR A MOVABLE MEMBER

Shigeru Shimonou, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed May 18, 1982, Ser. No. 379,356
Claims priority, application Japan, May 18, 1981, 56-74420
Int. Cl.³ G05B *13/00*
U.S. Cl. 318—561 **11 Claims**



1. A system for controlling the positioning of a movable member to a commanded position, said system comprising:

means including a motor for moving said movable member;

first means responsive to the physical position of said movable member for producing a position error signal which is representative of a distance between a present position of said movable member and said commanded position;

second means responsive to the physical position of said movable member for producing a velocity signal representative of a velocity of said movable member;

third means responsive jointly to said position error signal and said velocity signal for producing a deceleration signal which is representative of a deceleration that is necessary to position said movable member to said commanded position by decelerating said movable member from a velocity at said present position; and

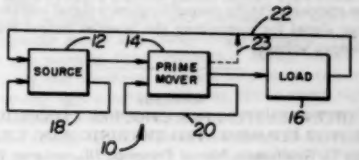
means for applying said deceleration signal to said motor when a level of said deceleration signal exceeds a predetermined level.

4,488,099

REAL TIME SERVO CONTROL APPARATUS AND METHOD

David H. LaForge, and Peer M. Portner, both of Kensington, Calif., assignors to Novacor Medical Corporation, Oakland, Calif.

Filed Dec. 3, 1982, Ser. No. 446,452
Int. Cl.³ H02P *5/40*
U.S. Cl. 318—561 **11 Claims**



1. In a dynamic system having a source of energy of a first type, a prime mover for converting said energy of said first type to energy of a second type, and a load, said prime mover applying said energy of said second type to said load, the converting of said energy occurring in cycles, each cycle being independent from each other, each independent cycle having different initial conditions of said load, a method for linear servo control of said source in response to variations in said load comprising:

formulating a model of said dynamic system to determine an operating point about which said dynamic system exhibits linear behavior, said operating point being a function of said initial conditions of said load during each said cycle;

modeling the energy requirements of said load to maintain said linear behavior and further modeling the amount of energy to be applied by said source as a function of said energy requirements of said load;

modeling the energy requirements of said prime mover to maintain said linear behavior;

determining the initial conditions of said load for each said cycle;

computing the difference between the actual energy requirements of said load during each said cycle from said modeled energy requirement; and

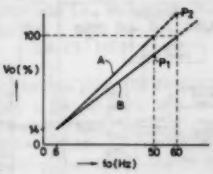
adjusting the energy developed by said source by an incremental amount which is linearly proportional to the difference between said energy requirements and said modeled energy requirements.

4,488,100

MOTOR CONTROLLER

Hiroshi Fujii, Funabashi; Akira Ishibashi, Tokyo, and Kenji Nando, Funabashi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 12, 1983, Ser. No. 457,511
Claims priority, application Japan, Jan. 20, 1982, 57-6115
Int. Cl.³ H02P *5/40*
U.S. Cl. 318—798 **7 Claims**



1. A motor controller comprising: an ac power source, an induction motor, an inverter coupled between the the ac power source and the induction motor for energizing the in-

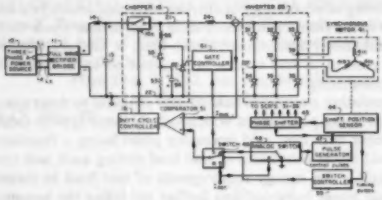
duction motor in accordance with the output frequency and voltage of the ac power source; a frequency detection means for detecting the output frequency of the ac power source; an arithmetic and logic operation means for performing an operation on the function of the inverter output voltage with respect to the inverter output frequency and for producing an output frequency signal and an output voltage signal; a selection means for selecting a value of constants for the function used in the arithmetic and logic operation according to the output from the frequency detecting means; and a switching control means responsive to the output frequency signal and the output voltage signal for controlling the inverter output frequency and output voltage.

4,488,101

STARTING SYSTEM FOR CHOPPER CONTROLLED MOTOR-COMMUTATED THYRISTOR INVERTER

George H. Studtmann, Mount Prospect, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 23, 1982, Ser. No. 452,557
Int. Cl.³ H02P 5/40
U.S. Cl. 318—800 10 Claims



1. A starting system for a chopper controlled motor-commutated thyristor inverter comprising:

means for regulating the chopper and for turning on the thyristor switching devices in the inverter in predetermined sets and in a prescribed sequence to current pulse energize the motor to effect step-by-step rotation thereof;

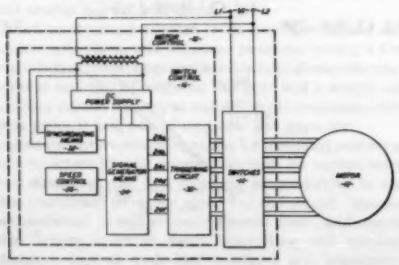
and means, including a d-c voltage source, for rapidly absorbing the reactive energy locked in the motor inductance to minimize the decay time of the motor current to zero at the termination of each energizing pulse to permit faster turn on of the next set of thyristor switching devices.

4,488,102

ELECTRONIC SWITCH CONTROL METHOD

H. Wayne Sams, Syracuse, and Nicholas Campitello, Kirkville, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Aug. 30, 1982, Ser. No. 412,751
Int. Cl.³ H02P 7/36
U.S. Cl. 318—810 1 Claim



1. A method for controlling a plurality of electronic switches employed to connect an alternating current voltage source with a motor, the method comprising the steps of:

generating a signal;

directing the signal to each of a series of output lines in sequence;

regularly repeating the directing step;

conducting the signal from the output lines to the electronic switches to actuate the electronic switches;

counting the number of times the voltage of the voltage source passes through a zero magnitude value; and

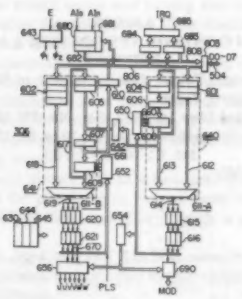
directing the signal to an output line in response to the voltage of the voltage source passing through the first zero magnitude value after passing through a preset number of zero magnitude values to maximize the number of times the electronic switches are actuated and deactuated at points in the voltage cycle of the voltage source where the voltage has a substantially zero magnitude value.

4,488,103

MOTOR CONTROL METHOD AND CONTROL APPARATUS THEREFOR

Shigeki Morinaga, Hitachi, and Yasuyuki Sugiura, Takahagi, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

PCT No. PCT/JP82/00153, § 371 Date Dec. 28, 1982, § 102(e) Date Dec. 28, 1982, PCT Pub. No. WO82/03953, PCT Pub. Date Nov. 11, 1982
Pub. Date May 4, 1982, Ser. No. 459,874
Claims priority, application Japan, May 6, 1981, 56-66868
Int. Cl.³ H02P 5/40
U.S. Cl. 318—811 3 Claims



1. In a motor control system, including a pulse width modulation inverter for producing a multi-phase AC voltage by converting a DC voltage in response to a pulse width modulation signal to determine each phase of said multi-phase AC voltage, an apparatus for producing said pulse width modulation signal on the basis of comparison between a carrier wave and a modulating wave determined by a computer according to a desired speed of the AC motor, comprising:

clock signal generating means for producing a clock signal;

first register file means, periodically operating in response to said clock signal, for producing a carrier wave signal, including first reference register means for storing a predetermined upper limit and a predetermined lower limit of said carrier wave signal, first instantaneous register means for storing first data representative of the instantaneous value of the carrier wave signal, and incrementing means for increasing incrementally the first data stored in said first instantaneous register means when said first data is not less than said lower limit of the carrier wave signal and for decreasing incrementally said first data stored in said first instantaneous register means when said first data is not larger than said upper limit of said carrier wave signal;

auxiliary register means connected to said first register file

means for receiving and storing said first data in said first instantaneous register means;

second register file means, periodically operating in response to said clock signal, for producing a pulse width modulation signal, including second reference register means for storing a plurality of second data values each of which represent a half period of a respective phase of a modulating wave based on the desired speed of the motor as determined by said computer, means for sequentially selecting said plurality of second data values from said second reference register means depending on the phase of the pulse width modulation signal to be produced, and means for comparing the selected second data values stored in the second reference register means and the value of the first data stored in said auxiliary register;

fundamental wave generator means responsive to said first register file means for generating a fundamental wave signal for each phase of the modulating wave; and

means connected to said fundamental wave generator means and said second register file means for producing said pulse width modulation signal for each phase on the basis of said comparison between said selected second data values with said first data and said fundamental wave signal.

4,488,104

POWER SOURCE APPARATUS FOR A FLASH LAMP USED IN A PULSE LASER APPARATUS

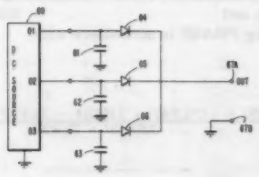
Masaharu Suzaki, Ootawara, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Filed Nov. 15, 1982, Ser. No. 441,743

Claims priority, application Japan, Nov. 13, 1981, 56-181805

Int. Cl.³ H02J *15/00*

U.S. Cl. 320—1 **4 Claims**



1. A power source for a flash lamp employed to excite a pulse laser apparatus, comprising:

an output terminal for coupling to the flash lamp;

a plurality of condensers;

means for charging each of said condensers to a different D.C. voltage; and

a plurality of diodes, each connected to couple one of said condensers to said output terminal to thereby define parallel discharge paths from said condensers to said output terminal, said diodes being oriented to prevent discharge of a given condenser until the greatest charge on any one of said condensers is substantially equal to or less than the charge on said given condenser.

4,488,105

STARTING CIRCUIT FOR ALTERNATOR OF AN AUTOMOTIVE VEHICLE

Samuel Papazian, Decines, France, assignor to Societe de Paris et du Rhone, Lyons, France

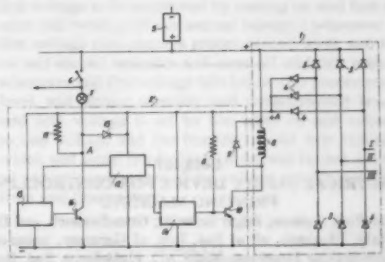
Filed Jul. 23, 1982, Ser. No. 401,353

Claims priority, application France, Jul. 31, 1981, 81 15227

Int. Cl.³ H02J *7/14*

U.S. Cl. 320—64 **8 Claims**

1. A starting circuit for an automobile having an alternator; said alternator comprising auxiliary rectification means, a main terminal, an auxiliary terminal, and excitation coil means; said starting circuit comprising regulator means, a battery, an ignition key switch, a warning light means, and circuit means connecting said battery said ignition switch and said warning light into a series circuit with each other; said regulator means comprising power control means in series circuit with said alternator excitation coil means, said regulator means comprising stabilized power supply means and circuit means including a diode connecting said warning light series circuit to the input of said stabilized power supply means, circuit means including a resistor connecting said alternator auxiliary power terminal to the input of said stabilized power supply via a point in said previously mentioned diode and warning light series circuit, said regulator means also comprising regulating comparator means and warning light comparator means, circuit means connecting said alternator auxiliary terminal to one input of said warning light comparator means, circuit means supplying a first output of said stabilized power supply to a second input of said warning light comparator means, said warning light comparator means producing an output when the voltage at



said alternator auxiliary terminal exceeds the voltage of said first output of said stabilized power supply, said warning light comparator means comprising a transistor, circuit means connecting the base of said transistor to the output of said warning light comparator means and connecting the remaining terminals of said transistor in series circuit with said ignition switch and warning light series circuit, circuit means connecting one input of said regulating comparator means to a second output of said stabilized power supply and another input of said regulating comparator means to said alternator auxiliary terminal, said regulating comparator means producing an output when the voltage of said second output of said stabilized power supply is greater than the voltage at said alternator auxiliary terminal, circuit means connecting the output of said regulating comparator means to control said power control means for said alternator excitation means, and circuit means including a resistor connecting said alternator auxiliary terminal to said previously mentioned circuit means between said regulating comparator means and said power control means.

4,488,106

RESETTABLE POWER LIMITING APPARATUS

Alan Chernotsky, 36 Lakeshore Dr., Rockaway, N.J. 07866, and Richard Satz, 20 Cedar La., Succasunna, N.J. 07876

Filed Jul. 1, 1982, Ser. No. 394,480

Int. Cl.³ H02J *13/00*

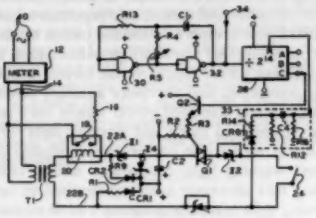
U.S. Cl. 323—239 **16 Claims**

1. Apparatus for limiting power by limiting the duty cycle of current carried by a pair of lines, said lines intermittently conducting electrical power, comprising:

a clock means for providing a periodic timing signal, said clock means being resettable to change the phasing of said timing signal;

a switch means serially coupled to at least one of said lines to periodically interrupt current of said lines with a period proportional to the period of said periodic timing signal; and

reset means coupled to at least one of said lines for resetting said clock means in response to the average magnitude of



voltage across said lines increasing by a predetermined extent.

4,488,107

ELECTRICAL SAFETY DEVICE FOR CONTROLLING A PRINTING MACHINE

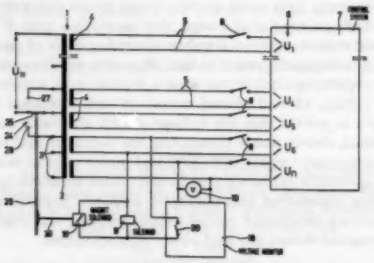
Anton Rodi, Leimen; Edgar Schmidt, Grasellenbach, and Dieter Uhrig, Eberbach, all of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed May 3, 1982, Ser. No. 374,246

Claims priority, application Fed. Rep. of Germany, May 2, 1981, 3117338

Int. Cl.³ H02J 3/12

U.S. Cl. 323—340 **14 Claims**



1. Electrical safety device for a control system of a printing machine having a control transformer with a plurality of primary and secondary taps for varying voltage levels comprising respective control lines connected to said secondary taps, a voltage monitoring device for monitoring impermissible voltage variations, said voltage monitoring device being connected in a respective control line of one of said secondary taps which is representative of all of the control lines, switch means for automatically switching off all of said control lines to said secondary taps so as to prevent damage to electronic components connected to said control lines, error signalling means coupled with said voltage monitoring device for alerting an operator of the printing machine to an impermissible voltage variation, and a manually operative voltage changing switching device operatively associated with one of said primary taps for adapting a control voltage to variations of a supply voltage.

4,488,108

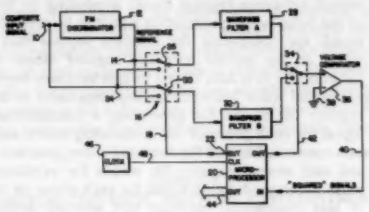
PHASE DETECTOR ERROR COMPENSATION APPARATUS

Jan E. Treise, West Melbourne, and Harley W. Beningfield, Satellite Beach, both of Fla., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 27, 1982, Ser. No. 412,346

Int. Cl.³ G01R 25/00

U.S. Cl. 324—83 D **5 Claims**



1. The method of measuring PHASE comprising, the steps of:

measuring the positive half cycle reference signal time THREF;

measuring the negative half cycle reference signal time TLREF;

measuring the positive half cycle variable signal time THVAR;

measuring the negative half cycle variable signal time TLVAR;

measuring the displacement time TPHI between identical phase occurrences of said reference and variable phase signals; and

calculating PHASE in accordance with:

$$PHASE = \frac{TPHI + \frac{1}{2}[TLREF - THREF - TLVAR + THVAR]}{THREF + TLREF}$$

4,488,109

PHASE DETECTORS FOR DETECTING A MUTUAL PHASE DIFFERENCE BETWEEN TWO SIGNALS

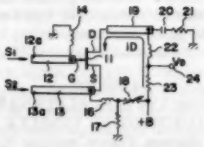
Takashi Otobe; Yasutoshi Komatsu, and Yoshikazu Murakami, all of Yokohama, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 7, 1983, Ser. No. 456,503

Claims priority, application Japan, Jan. 9, 1982, 57-2145

Int. Cl.³ G01R 25/00

U.S. Cl. 324—83 R **8 Claims**



1. A phase detector for detecting a mutual phase difference between two signals comprising:

first and second input terminals being supplied with first and second input signals, respectively, a field effect transistor having at least one gate electrode, a source electrode and a drain electrode, two of the electrodes of said field effect

transistor being used as first and second input electrodes, respectively,

a first signal path provided between said first input terminal and said first input electrode of the field effect transistor for transmitting said first input signal to said first electrode of the field effect transistor, said first signal path being so selected to impart a first phase shift to said first input signal transmitted therethrough to said first input electrode of the field effect transistor, a second signal path provided between said second input terminal and said second input electrode of the field effect transistor for transmitting said second input signal to said second electrode of the field effect transistor, said second signal path being so selected to impart a second phase shift to said second input signal transmitted therethrough to said second electrode of the field effect transistor, said second phase shift being different by a predetermined amount of phase from said first phase shift,

a biasing resistor connected to the source electrode of said field effect transistor,

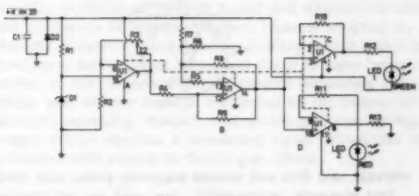
a current source for supplying a biasing current to said biasing resistor, and

a load circuit connected to the drain electrode of said field effect transistor for deriving an output signal representing the mutual phase difference between said first and second input signals.

4,488,110
VOLTAGE MONITOR WITH VISIBLE LEVEL INDICATOR

Thomas F. Shirey, Hinsdale; William C. Serviss, Worth, both of Ill., and Curtis H. Young, Jr., Doraville, Ga., assignors to Electro-Sensor, Inc., Oak Lawn, Ill.

Filed Dec. 29, 1980, Ser. No. 220,999
Int. Cl.[3] G01R *19/14*; G08B *21/00*
U.S. Cl. 324—133 **4 Claims**



1. A voltage monitor which monitors a first voltage comprising:

(a) a means for providing a fixed reference voltage and an operational amplifier of variable gain with input from said fixed reference voltage whereby the output of said operational amplifier provides a variable reference second voltage, the reference second voltage being at a lesser voltage than said first voltage;

(b) a signal third voltage which is a fraction of said first voltage and is obtained by a voltage divider network from said first voltage;

(c) a comparison amplifier which has a first input to which said reference second voltage is connected and a second input to which said signal third voltage is connected, and an output terminal, the voltage of said output terminal depending upon the difference of the two voltages applied to the first and second inputs;

(d) polarity of said amplifier connected such that when said signal third voltage exceeds said reference second voltage then said output terminal of said comparison amplifier is driven toward ground, and when said signal third voltage is less than said reference second voltage then said output terminal of said comparison amplifier is driven toward power supply voltage;

(e) a first indicator;

(f) a second indicator;

(g) a first driver amplifier

(h) a second driver amplifier;

(i) said first driver amplifier and said second driver amplifier each having its input connected to said output terminal of said comparison amplifier, wherein said first driver amplifier drives said first indicator on when its input is driven toward ground potential and drives said first indicator off when its input is driven toward power supply voltage, and wherein said second driver amplifier drives said second indicator on when its input is driven toward power supply voltage and drives said second indicator off when its input is driven toward ground potential;

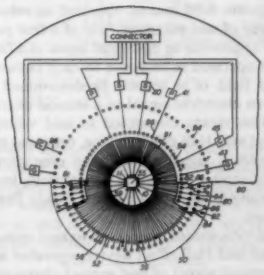
(j) power supply for said variable reference second voltage, said comparison amplifier, said first driver amplifier, said second driver amplifier, said first indicator, and said second indicator is taken from said first voltage to be monitored;

whereby the voltage monitor provides an indication of said first voltage to be monitored by turning on said first indicator and turning off said second indicator whenever said first voltage rises above a predetermined level, and turns on said second indicator and turns off said first indicator whenever said first voltage falls below said predetermined level, and further whereby said predetermined level of said first voltage is set by the value of said reference second voltage and the fraction of said first voltage at which said signal third voltage is set, and further whereby all power requirements of the voltage monitor are drawn from said first voltage.

4,488,111
COUPLING DEVICES FOR OPERATIONS SUCH AS TESTING

Arnold B. Widdowson, Reading, Pa., assignor to AT&T Technologies, Inc., New York, N.Y.

Filed Jun. 1, 1982, Ser. No. 383,875
Int. Cl.[3] G01R *1/06*
U.S. Cl. 324—158 F **8 Claims**



1. Apparatus for electrically coupling device contacts on a card to circuit elements on a circuit board, said device contacts being disposed outwardly from and in at least one circular array around an axis perpendicular to a plane parallel to the card whereat a device being contacted is generally located, comprising:

a coupler board having first and second major faces, a thickness therebetween to accommodate means for coupling to the device contacts and circuit elements and having an axis extending through the board and perpendicular to at least one of the major faces, said axis being common to the axis of the contacts on the card;

means in the first major face for coupling to said contacts on the card, such means being disposed outwardly from and in at least one circular array around the common axis;

means in the second major face for coupling to said circuit elements, at least a first circuiar array of such means being disposed inwardly from the most inwardly disposed contact coupling means and around the common axis; and

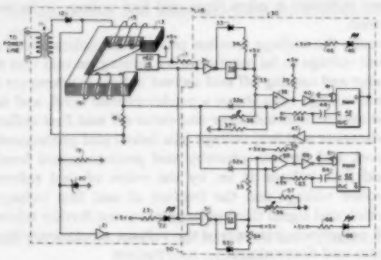
means for electrically connecting respective ones of said circuit element coupling means to respective ones of said contact coupling means.

4,488,112

HALL EFFECT DEVICE TEST CIRCUIT

Robert Thompson, Sharon, N. Dak., and Hendrik W. van Husen, Glen Ellyn, Ill., assignors to GTE Automatic Electric Inc., Northlake, Ill.

Filed Aug. 30, 1982, Ser. No. 412,758
Int. Cl.³ G01R *35/00*
U.S. Cl. 324—202 **16 Claims**



1. A Hall effect device test circuit for use in a test system including a power signal source, said test circuit comprising:

magnetic field means connected to said power signal source, operated in response to said power signal to periodically provide a magnetic field of varying intensity;

voltage reference means connected to said power source, operated in response to said power signal, to periodically provide a sample voltage of varying magnitude and proportional to the intensity of said magnetic field;

a Hall effect device connected in magnetic field proximity to said magnetic field means, operated in response to each occurrence of said magnetic field of a first predetermined intensity to provide an electrical signal of a first characteristic, and operated in response to each occurrence of said magnetic field of a second predetermined intensity to provide an electrical signal of a second characteristic;

first detection means connected to said voltage reference means and said Hall effect device, operated in response to each electrical signal of said first characteristic and an associated sample voltage of a magnitude less than a first predetermined value to provide a steady first visual indication; and

second detection means connected to said voltage reference means and said Hall effect device, operated in response to each electrical signal of said second characteristic and an associated sample voltage of a magnitude greater than a second predetermined value to provide a steady second visual indication.

4,488,113

MAGNETIC BRIDGE PROXIMITY SENSOR

Frank W. Heemstra, Fort Washington, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 15, 1982, Ser. No. 398,500
Int. Cl.³ G01B *7/14*; G01R *33/00*
U.S. Cl. 324—207 **5 Claims**

1. A proximity sensor for indicating the spatial proximity of a ferrous object comprising:

a magnetic reluctance bridge including

a dc magnetic field generating means including first and second magnetic poles with an axis of symmetry therebetween;

a first high magnetic permeability ferrous section having first and second ends disposed in a non-touching manner across said first and second magnetic poles and balanced relative to said axis of symmetry;

a first low magnetic permeabilty gap with a reluctance R_1 disposed between said first magnetic pole and said first end of said first ferrous section;

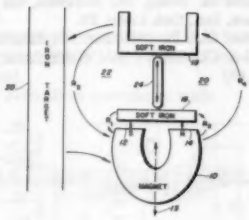
a second low magnetic permeability gap with a reluctance R_2 disposed between said second magnetic pole and said second end of said first ferrous section;

wherein said first and second magnetic poles, said first low magnetic permeability gap, said first ferrous section, and said second low magnetic permeability gap form a first magnetic flux circuit;

a second high magnetic permeability ferrous section with third and fourth ends disposed in parallel with said first ferrous section a predetermined distance therefrom away from said first and second magnetic poles and balanced relative to said axis of symmetry;

a third low magnetic permeability gap with a reluctance R_3 disposed between said first magnetic pole and said third end of said second ferrous section;

a fourth low magnetic permeability gap with a reluctance R_4 between said magnetic pole and said fourth end of said second ferrous section;



wherein said first and second magnetic poles, said third low magnetic permeability gap, said second ferrous section, and said fourth low magnetic permeability gap form a second magnetic flux circuit;

wherein said reluctances R_1, R_2, R_3, R_4 are related by the equation $R_1/R_2=R_3/R_4$;

magnetic flux sensing element disposed approximately along said axis of symmetry between said first and second ferrous elements to form the center reluctance path for said magnetic reluctance bridge in order to sense flux when the magnetic reluctance bridge is unbalanced in reluctance;

wherein said first and third low magnetic permeability gaps overlap and are disposed on one side of said magnetic flux sensing element, and said second and fourth low magnetic permeability gaps over lap and are disposed on the opposite side of said magnetic flux sensing element from said first and third low magnetic permeability gaps;

wherein a ferrous object disposed adjacent either said third low magnetic permeability gap or said fourth low magnetic permeability gap will unbalance said magnetic reluctance bridge and cause flux to be detected by said sensing element; and

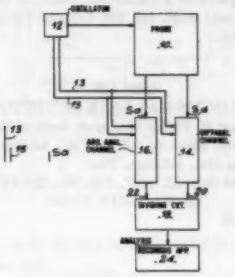
means for generating a triggering signal in response to flux detected by said flux sensing element.

4,488,114

DEVICE FOR NON-DESTRUCTIVE TESTING BY EDDY CURRENTS COMPRISING AIR-GAP CORRECTION MEANS

Bernard David, Gif-Sur-Yvette, and Michel Pigeon, Bures Sur Yvette, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Mar. 23, 1982, Ser. No. 360,901
Claims priority, application France, Mar. 23, 1981, 81 05753
Int. Cl.³ G01N *27/72, 27/82;* G01R *33/12*
U.S. Cl. 324—225 **9 Claims**



1. A device for non-destructive testing by eddy currents permitting a correction of air gap effects, comprising a probe having at least two windings connected in opposition and supplied by an exciting current having a given frequency, said windings belonging to a differential measuring bridge and being sensitive to adjacent areas of the member to be tested, said device also comprising a differential analysis channel supplied by the differential measuring bridge, wherein the probe used also comprises an absolute measuring winding sensitive to the member to be tested and wherein the device also comprises an absolute analysis channel supplied by the absolute measuring winding and a dividing circuit with a dividend input and a divisor input, said dividend input being connected to the output of the differential measuring channel, whilst said devisor input is connected to the output of the absolute measuring channel, said dividing circuit having an output which supplies a measuring signal which has been corrected with respect to the air gap effects.

4,488,115

LOW BATTERY VOLTAGE INDICATOR CIRCUIT FOR A METAL DETECTOR

Robert J. Podhrasky, Dallas, Tex., assignor to Garrett Electronics, Garland, Tex.

Division of Ser. No. 206,182, Nov. 12, 1980, Pat. No. 4,423,377. This application Sep. 30, 1982, Ser. No. 429,489
Int. Cl.³ G01R *19/165, 31/36;* G01V *3/11*
U.S. Cl. 324—329 **3 Claims**

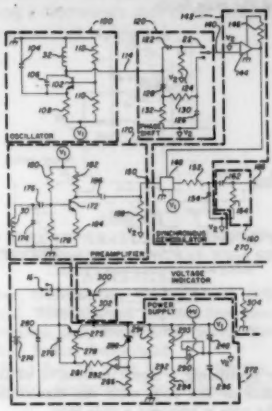
1. A low battery voltage indicator circuit for providing an audio indication of battery status for a portable metal detector which is powered by a battery and has an audio output for indicating detection of an object to an operator, comprising:

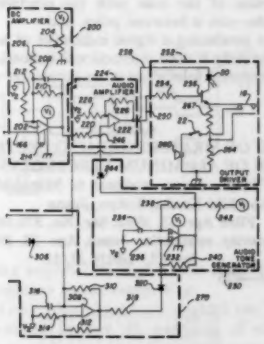
a first audio frequency oscillator for producing said audio output in response to a signal generated by said metal detector upon detecting an object,

a second audio frequency oscillator having an oscillation frequency lower than that of said first audio frequency oscillator, said second audio frequency oscillator connected to modulate said first audio frequency oscillator to produce a warbling effect for said audio output,

a voltage level detector connected to monitor the voltage of said battery and produce a selected output when the voltage of said battery drops below a preset voltage, and

means connected to said voltage level detector for receiving said selected output and further connected to said second audio frequency oscillator for permitting said second audio frequency oscillator to modulate said first audio frequency oscillator when the voltage of said battery exceeds said preset voltage and for disabling said second audio frequency oscillator upon receipt of said selected





output when the voltage of said battery goes below said preset voltage to terminate the modulation of said first audio frequency oscillator by said second audio frequency oscillator whereby the generation of a non-modulated output from said first audio frequency oscillator indicates a low battery voltage condition to said operator.

4,488,116

INDUCTIVE COIN SENSOR FOR MEASURING MORE THAN ONE PARAMETER OF A MOVING COIN

George A. Plesko, Graterford, Pa., assignor to Mars, Incorporated, McLean, Va.

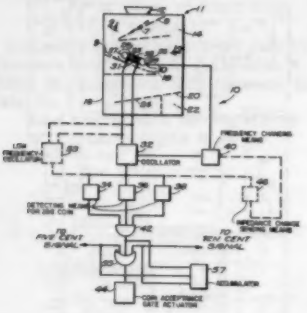
Filed Sep. 22, 1981, Ser. No. 304,689
Int. Cl.³ G01N *27/72;* G01R *33/12;* G07F *3/02*
U.S. Cl. 324—236 **25 Claims**

1. An apparatus for identifying coins with respect to authenticity and denomination comprising:

an oscillator circuit comprising an inductor arranged to subject a coin to an electromagnetic field, the inductor comprising an elongated ferrite core and a coil, the core having first and second poles forming first and second pole faces, the first and second pole faces separated from each other by a distance greater than the greatest linear dimension of at least one pole face, the first and second

poles connected by a pole connecting member around which is wound the coil, and the pole connecting member having a major axis lying in a plane substantially parallel to the faces of the core,

means for causing relative motion of the coin through the electromagnetic field along a predetermined coin path adjacent the pole faces,



means for producing a signal indicative of the degree of interaction of the coin with the electromagnetic field when the coin is adjacent a pole face,

means for producing a signal indicative of the degree of interaction of the coin with the electromagnetic field when the coin is between poles, and

means for producing a signal indicative of acceptability of the coin only if both interactional indications are within predetermined tolerances of an acceptable coin.

4,488,117

METHOD OF MEASURING BACKELECTROMOTIVE FORCES OF ALUMINUM ELECTROLYSIS CELLS

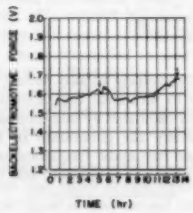
Yuzo Seo, Tokyo, Japan, assignor to Mitsubishi Keikinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 21, 1982, Ser. No. 370,189

Claims priority, application Japan, Apr. 28, 1981, 56-65054

Int. Cl.³ G01N *27/42*

U.S. Cl. 324—425 **7 Claims**



1. A method of measuring a backelectromotive force of an aluminum electrolysis cell comprising the steps of:

(a) repeatedly measuring voltage V and current I of said cell at a short interval;

(b) forming groups of data each including measured values thus obtained within a relatively short period;

(c) calculating a constant e and its variance Ve with reference to each data group according to a linear regression expressed by an equation

$$V=rI+e$$

where r represents an internal resistance of said cell;

(d) calculating a backelectromotive force E and its variance V_E at a given time based on said constant e and its variance Ve calculated at said step (c), a backelectromotive force E' and its variance V'_E with reference to a data group preceding said given time and a constant V_T, and according to the following equations:

$$P=(V'_E+V_T)/(Ve+V'_E+V_T)$$

$$E=Pe+(1-P)E'$$

$$V_E=P^2Ve+(1-P)^2(V'_E+V_T)$$

where P represents a parameter; and

(e) repeating said steps (a), (b), (c) and (d) at a relatively short interval.

4,488,118

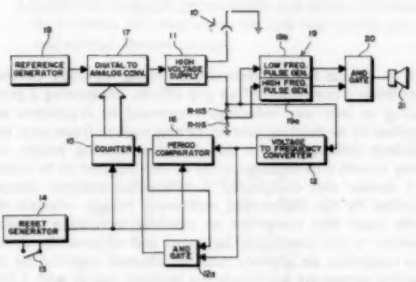
HALOGEN GAS LEAK DETECTOR

Edward A. Jeffers; R. Philip McLeroy, both of Hollywood, and Jose L. Sacerio, Hialeah, all of Fla., assignors to Control Power Systems Inc., Hialeah, Fla.

Filed Sep. 22, 1981, Ser. No. 304,483

Int. Cl.³ G01N *27/60*

U.S. Cl. 324—455 **3 Claims**



1. Apparatus for measuring the presence of trace amounts of a halogen gas contaminant in ambient air comprising, in combination, a sensing tip having a pair of electrodes defining an air gap, a high-voltage generator, said high-voltage generator having a high-voltage output circuit supplying a potential to said pair of electrodes for establishing a negative corona discharge current across said air gap in the continuous corona range, means for producing a digital signal, means including a digital signal feedback loop controlled by said sensing tip corona discharge current for adjusting said high-voltage potential to obtain optimum sensing tip corona discharge current for high sensitivity to halogen impurity concentration irrespective of the contaminant concentration present, and electrical indicator means controlled by the corona current in said sensing tip.

4,488,119

FM DEMODULATOR

Christopher B. Marshall, Harpenden, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 4, 1982, Ser. No. 345,863

Claims priority, application United Kingdom, Feb. 20, 1981, 8105456

Int. Cl.³ H03D *3/00*

U.S. Cl. 329—50 **1 Claim**

1. A FM demodulator which comprises:

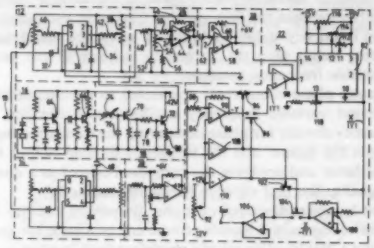
an input terminal for receiving a frequency-modulated input signal;

first and second mixers each having first and second inputs and each having an output, the first inputs of the mixers being connected to the input terminal;

first means for producing a first local oscillator signal;

second means for producing a second local oscillator signal having the same frequency as, and being phase shifted by 90° relative to, the first local oscillator signal, the second input of the second mixer being connected to the first means, the second input of the first mixer being connected to the second means;

a signal divider including a first input, a second input and an output which comprises an output of the demodulator, the



first input of the divider being coupled to the output of the first mixer, and

an integrator coupled to the second input of the divider and to the output of the second mixer, so that a low frequency signal at the output of the second mixer is phase shifted in the integrator by 90° more than the phase of a low frequency signal at the output of the first mixer, the low frequency signals being applied to the divider, whereby a signal corresponding to a modulating signal of the input signal is obtained at the output of the divider.

4,488,120

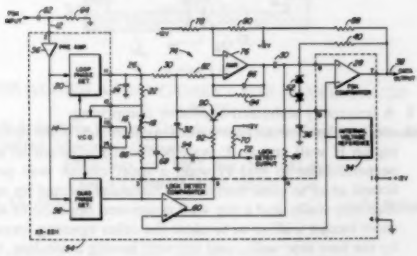
FREQUENCY SHIFT KEYING DEMODULATOR USING A PHASE LOCKED LOOP AND VOLTAGE COMPARATOR

Ralph T. Carsten, Nepean, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Mar. 15, 1982, Ser. No. 358,202

Int. Cl.³ H03D *3/22*

U.S. Cl. 329—122 **11 Claims**



1. An FSK demodulator comprising:

a phase locked loop which is responsive to an FSK input signal to produce an output voltage which varies, in dependence upon the FSK input signal, about a voltage corresponding to a center frequency of the FSK input signal, the phase locked loop including means for detecting phase lock;

a voltage comparator for producing a demodulated output signal;

means for applying a d.c. reference voltage, corresponding to a nominal center frequency of the FSK input signal, to a first input of the voltage comparator;

d.c. blocking means comprising a coupling capacitor for coupling the output voltage of the phase locked loop to a second input of the voltage comparator;

d.c. restoring means for maintaining, during phase lock, the average voltage at said second input of the voltage comparator at substantially said d.c. reference voltage; and

means responsive to the phase lock detecting means for establishing a determinate state of the coupling capacitor when no phase lock is detected.

4,488,121

METHOD AND APPARATUS FOR AMPLIFYING AN ANALOG LOW-FREQUENCY SIGNAL BY A SWITCHING AMPLIFIER

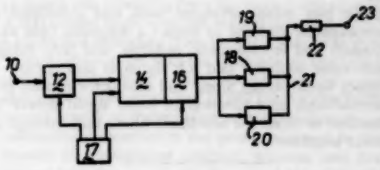
Andreas Furrer, Schneisingen; Vaclau Mertl, Dübendorf; Johann Milavec, Windisch, and Herbert Stemmler, Kirchdorf, all of Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Jan. 28, 1982, Ser. No. 343,770

Claims priority, application Switzerland, Feb. 16, 1981, 992/81

Int. Cl.³ H03F *3/38*

U.S. Cl. 330—10 **6 Claims**



1. A switching amplifier for high power amplification of an analog low-frequency signal, comprising:

a plurality of switching stages each of which can be independently switched on and off, and each of which has a switched-on condition in which a nearly constant voltage is delivered at a respective output;

at least two switching channels connected in parallel within each of said switching stages, wherein each of said switching channels comprises a pulse transformer having a primary side connected to a voltage source via a switching element, and a secondary side connected to the output of the respective switching channel via a rectifier;

an A/D converter for measuring at predetermined intervals of time the instantaneous value of the amplitude of said analog low frequency signal and for generating a digital value corresponding to said instantaneous amplitude value;

a storage device having a plurality of storage cells each of which corresponds to one of said switching stages;

means provided for setting a number of said storage cells corresponding to said digital value;

a control-pulse generator which in accordance with the set storage cells generates control pulses for driving the respective switching stages, wherein the switching channels of said driven switching stages are alternately switched on and off by actuating their respective switching elements; and

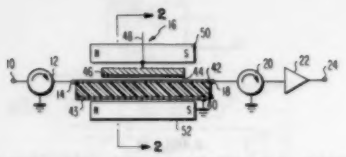
means provided for summing the output voltages of said switching channels and switching stages respectively.

4,488,122

METHOD AND APPARATUS FOR COMPENSATING NON-LINEAR PHASE SHIFT THROUGH AN RF POWER AMPLIFIER

Herbert J. Wolkstein, Livingston, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 29, 1982, Ser. No. 437,837
Int. Cl.³ H03F 1/26
U.S. Cl. 330—149 **6 Claims**



2. In a circuit for amplifying RF signals at a narrow frequency band comprising a power amplifier which imparts a non-uniform phase shift to signal passage therethrough as a function of input signal power, apparatus coupled to the input of said amplifier for compensating for said non-uniform phase shift through said amplifier, comprising in combination:

a microstrip including a narrow conductor coupled at one end to the output to said amplifier and at the other end to the input of said circuit;

a layer of ferrimagnetic material adjacent said conductor; and

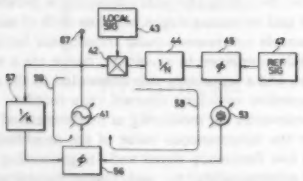
magnetic bias means arranged with said conductor and ferrimagnetic material to impart a magnetic field to encompass said ferrimagnetic material, said field being of such value to cause said RF signal at said narrow frequency band passing along said conductor to shift phase therethrough as a function of input signal power in a direction to offset the non-linear phase shift through said power amplifier.

4,488,123

FREQUENCY SYNTHESIZER

Takenori Kurihara, Gyoda, Japan, assignor to Takeda Riken Co., Ltd., Tokyo, Japan

Filed Dec. 16, 1981, Ser. No. 331,291
Claims priority, application Japan, Dec. 29, 1980, 55-186693
Int. Cl.³ H03L 7/18
U.S. Cl. 331—2 **15 Claims**



1. A frequency synthesizer comprising

a first variable frequency oscillator capable of changing its oscillation frequency by a control signal;

a first frequency divider connected to the output of the first variable frequency oscillator for frequency dividing its oscillation output;

a variable frequency divider also connected to the output of the first variable frequency oscillator for frequency dividing its oscillation output by a selectively variable frequency dividing ratio;

a first reference signal source for generating a first reference signal of a predetermined frequency;

a first phase comparator connected to the output of the first reference signal source and the variable frequency divider for phase comparing the first reference signal and the output from the variable frequency divider;

a second variable frequency oscillator connected to the output of the first phase comparator so that the oscillation frequency of the second variable frequency oscillator is controlled by the output from the first phase comparator, the second variable frequency oscillator being superior in frequency stability and in the linearity of its oscillation frequency variation with respect to variation in the control signal than the first variable frequency oscillator, and the frequency stability of the first reference signal source being better than the frequency stability of the second variable frequency oscillator;

a second phase comparator connected to the output of the second variable frequency oscillator and the first frequency divider for phase comparing the oscillation output from the former and the frequency-divided output from the latter and applying the compared output as a control signal to the first variable frequency oscillator;

a first local signal source of higher frequency stability than that of the second variable frequency oscillator for generating a first local signal of a predetermined frequency; and

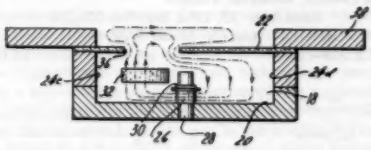
a first frequency converter connected to the outputs of the first variable frequency oscillator and the first local signal source for converting the output from the first variable frequency oscillator into a lower-frequency signal by the first local signal and supplying the lower-frequency signal to the variable frequency divider.

4,488,124

RESONANT CAVITY WITH DIELECTRIC RESONATOR FOR FREQUENCY STABILIZATION

Yoshikazu Yoshimura, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sep. 4, 1981, Ser. No. 299,395
Claims priority, application Japan, Dec. 10, 1980, 55-174318
Int. Cl.³ H03B 9/14; H01P 7/06
U.S. Cl. 331—107 DP **5 Claims**



1. A frequency stabilized oscillator comprising:

A rectangular resonant cavity having four side walls including an H wall and an E wall positioned adjacent to and perpendicular to said H wall, a short circuit wall positioned so as to close one of two openings formed by said four side walls, and a top wall positioned opposite to said short circuit wall so as to close the other opening formed by the four side walls, said top wall having a window, the distance between said short circuit wall and said top wall being less than one fourth of the wavelength of the resonant frequency of the resonant cavity;

a solid state oscillating device having one end connected to said short circuit wall;

a strip conductor disposed parallel to said short circuit wall, and extending perpendicularly through said H wall to the exterior of said cavity to thereby provide a DC supply terminal for said oscillating device; and

a disc-type dielectric resonator having a high Q and a high dielectric constant located between said oscillating device and said E wall so as to be electromagnetically coupled to said oscillating device,

whereby a frequency stabilized oscillating output is pro-

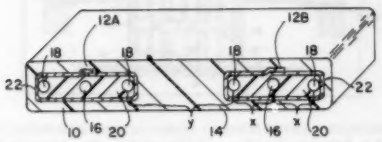
vided through said window when a voltage is applied to said strip conductor.

4,488,125

COAXIAL CABLE STRUCTURES AND METHODS FOR MANUFACTURING THE SAME

John M. Gentry, Candler; Virgil T. Bolick, Jr., Asheville, and Kenneth W. Brownell, Jr., Enka, all of N.C., assignors to Brand-Rex Company, Willimantic, Conn.

Filed Jul. 6, 1982, Ser. No. 395,368
Int. Cl.³ H01P 3/06
U.S. Cl. 333—1 **22 Claims**



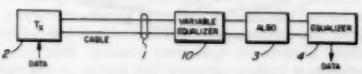
1. A coaxial cable comprising:
(a) a signal wire;
(b) at least one substantially straight drain wire spaced apart from and parallel to said signal wire; said drain wire being in the same plane with said signal wire for the entire length of said cable;
(c) an elongated minor matrix of dielectric material, within which said signal and drain wires are longitudinally embedded, said minor matrix having an outer surface through which each of said drain wires is partially exposed; substantially more of the surface of each of said drain wires being embedded than being exposed;
(d) a conductive shield overlying said elongate minor matrix, in electrical contact with substantially all of the surface of the part of the exposed portion of each of said drain wires facing said shield; and,
(e) a major matrix of dielectric material overlying said shield.

4,488,126

EQUALIZER ARRANGEMENT FOR MIXED-GAUGE CABLES

Mark S. Suthers, Lanark, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Nov. 18, 1982, Ser. No. 442,594
Int. Cl.³ H03H 7/03; H04B 3/04
U.S. Cl. 333—18 **7 Claims**



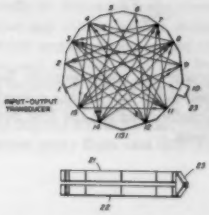
1. An equalizer arrangement comprising a first equalizer having a fixed, predetermined, equalization characteristic for equalizing signals transmitted via cable of a predetermined gauge, a second variable amplitude notch equalizer coupled in series with the first equalizer for complementing the equalization of signals by the first equalizer to equalize signals transmitted via cable of a different gauge, and control means responsive to the equalized signals for automatically controlling the equalization by the second equalizer.

4,488,127

BIFURCATED ELECTRO-ACOUSTIC DELAY LINES HAVING TRANSDUCERS BONDED AT AN AREA OF BIFURCATION

Roger G. Claes, St. Trond, Belgium, assignor to GTE Products Corporation, Stamford, Conn.

Filed Apr. 22, 1983, Ser. No. 487,646
Int. Cl.³ H03H 9/36, 9/125
U.S. Cl. 333—142 **21 Claims**



1. A bifurcated electroacoustic delay line comprising:
a first branch of transmission medium assuming a substantially pentagonal profile, said profile characterized by:
(a) a first side,
(b) second and third sides extending substantially perpendicularly from the first side and in a substantially parallel relationship with each other,
(c) a fourth side extending from the second side so as to form a first obtuse angle with the second side, and
(d) a fifth side extending from the third side so as to form a second obtuse angle with the third side, so that said fourth and fifth sides form a third obtuse angle at a point of intersection; said delay line FURTHER COMPRISING:
a second branch of transmission medium assuming a profile substantially identical to the profile assumed by the first branch of transmission medium, wherein said first and second branches are physically joined along and thereby define an area of bifurcation at their respective first sides,
a pluality of piezoelectric transducers including a first input transducer bonded to the first side of the first branch, a first output transducer bonded to the first side of the first branch, a second input transducer bonded to the first side of the second branch, a second output transducer bonded to the first side of the second branch, wherein the transducers are arranged so that the first input transducer and second output transducer are positioned laterally adjacent each other and the first output transducer and second input transducer are positioned laterally adjacent each other, and
means for electrically coupling the first output and second input transducers.

4,488,128

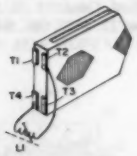
BIFURCATED ELECTROACOUSTIC DELAY LINE WITH DIAGONAL COUPLING

John A. Odozynski, Topsfield, Mass., assignor to GTE Products Corporation, Stamford, Conn.

Filed Apr. 22, 1983, Ser. No. 487,676
Int. Cl.³ H03H 9/30, 9/40, 9/125
U.S. Cl. 333—142 **20 Claims**

1. A bifurcated electroacousitic delay line comprising:
a first branch of transmission medium having a first input transducer and a first output transducer, said first transducers bonded to a first side of the first branch of transmission medium,
a second branch of transmission medium having a second input transducer and a second output transducer, said second transducers bonded to a first side of the second branch of the transmission medium, whereby said first and second branches are physically joined along their respec-

tive first sides so that the first input and second input transducers are positioned substantially laterally adjacent each other and the first output and second output trans-



ducer are positioned approximately laterally adjacent each other, said delay line further comprising:

means for diagonally coupling the first output and second input transducers.

4,488,129

DEVICE FOR CURRENT-READING OF A QUANTITY OF ELECTRIC CHARGES AND A CHARGE-TRANSFER FILTER EQUIPPED WITH SAID DEVICE

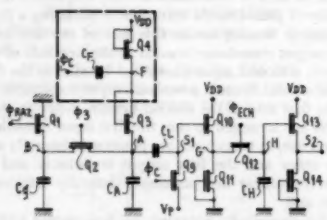
Roger Benoit-Gonin; Jean L. Berger, and Jean L. Coutures, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Sep. 17, 1982, Ser. No. 419,207

Claims priority, application France, Sep. 25, 1981, 81 18135

Int. Cl.³ H03H *15/02, 17/02;* **G11C** *19/28*

U.S. Cl. 333—165 **14 Claims**



1. A device for current-reading of a quantity of electric charges, comprising a first MOS transistor and a second MOS transistor connected in series to the point of arrival of the quantity of charges, a first capacitor connected through one of its terminals to the nodal point of the two transistors and a control circuit for said two transistors, the function of said control circuit being to charge the first capacitor and to maintain the first transistor in the saturating mode at the time of inflow of the charges, the effect of said inflow being to produce a variation in potential at the nodal point which delivers the reading signal, wherein said control circuit receives a constant potential and comprises:

a third MOS transistor whose drain and gate are connected to the constant potential and whose source is connected to the drain and to the gate of the second transistor;

a second capacitor connected through one of its terminal to the nodal point of the second transistor and third transistor.

4,488,130

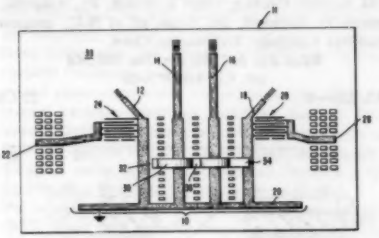
MICROWAVE INTEGRATED CIRCUIT, BANDPASS FILTER

Frederick A. Young, Huntington Beach; Robert J. Ahulii, Hawthorne, and Roy K. Rikimaru, Los Angeles, all of Calif., assignors to Hughes Aircraft Company, El Segundo, Calif.

Filed Feb. 24, 1983, Ser. No. 469,498

Int. Cl.³ H01P *1/205, 1/203*

U.S. Cl. 333—203 **4 Claims**



1. A microwave integrated circuit filter for electromagnetic signals comprising:

a transmission line extending longitudinally;

at least three resonators arranged serially along said transmission line; and

coupling means for electromagnetically coupling two non-adjacent of said resonators, said coupling means comprising a conductive ribbon which is inductively coupled to one of said resonators and is capacitively coupled to another of said resonators.

4,488,131

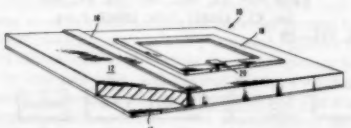
MIC DUAL MODE RING RESONATOR FILTER

Edward L. Griffin, Roanoke, Va.; Harvey M. Endler, Chatsworth, and Frederick A. Young, Huntington Beach, both of Calif., assignors to Hughes Aircraft Company, El Segundo, Calif.

Filed Feb. 25, 1983, Ser. No. 469,615

Int. Cl.³ H01P *7/08*

U.S. Cl. 333—205 **4 Claims**



1. A microwave integrated circuit electromagnetic filter assembly comprising:

a transmission line adapted to transmitting electromagnetic waves within a predetermined frequency band;

a resonator electromagnetically coupled to said transmission line so that electromagnetic transmissions along said transmission line can induce resonance in least two modes, said resonator defining a closed electromagnetic path; and

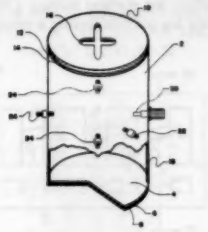
tuning means associated with said resonator for differentially tuning the two modes.

4,488,132

TEMPERATURE COMPENSATED RESONANT CAVITY

Adrian V. Collins, and Patrick M. Naraine, both of Cambridge, Canada, assignors to Com Dev Ltd., Cambridge, Canada

Filed Dec. 13, 1982, Ser. No. 448,970
Claims priority, application Canada, Aug. 25, 1982, 410102
Int. Cl.³ H01P 7/06, 1/30
U.S. Cl. 333—229 18 Claims



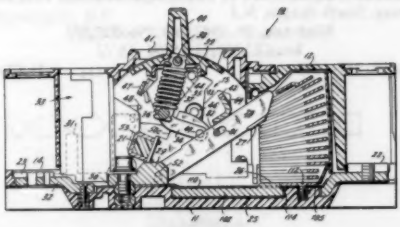
1. A temperature compensated resonant cavity comprising a housing having at least one multi-layered end cap, with at least two layers of said end cap having adjacent surfaces and being affixed to one another along said surfaces so that said adjacent surfaces are completely in contact, said two layers being composed of metal having different coefficients of thermal expansion, so that the volume of the cavity will remain substantially constant with changes in temperature with means for introducing electro-magnetic energy into said cavity.

4,488,133

CONTACT ASSEMBLY INCLUDING SPRING LOADED CAM FOLLOWER OVERCENTER MEANS

David P. McClellan, Westminster; Gerald R. Duble, New Windsor, and William H. Hofferberth, Finksburg, all of Md., assignors to Siemens-Allis, Inc., Atlanta, Ga.

Filed Mar. 28, 1983, Ser. No. 479,366
Int. Cl.³ H01H 61/02
U.S. Cl. 335—16 11 Claims



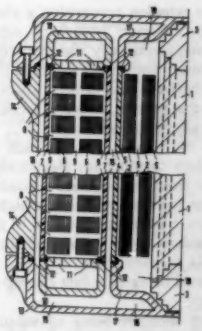
1. A circuit breaker including a stationary contact, a movable contact; a contact operating mechanism operatively connected to said movable contact for opening and closing said contacts; said contact operating mechanism including a contact arm on which said movable contact is mounted, drive means mounted for movement between an open and a closed position, a spring powered trip free overcenter toggle means extendable to move said drive means to said closed position and collapsible to move said drive means to said open position; said drive means including cam means having first and second cam formations; a follower mounted to said contact arm; contact pressure spring means urging said follower to engage said cam means; under normal current conditions, said follower being in operative engagement with said first cam formation to form an operative connection between said contact arm and said drive means whereby movement of the latter between said open and closed positions brings said movable contact out of and into engagement, respectively, with said stationary contact; conductor means connected to said stationary contact, disposed lengthwise of said contact arm and positioned adjacent thereto when said contacts are closed, said conductor being operatively connected in circuit with said contact arm for current to flow in opposite directions through said conductor and said contact arm to generate electrodynamic forces tending to open said contacts; under severe current conditions exceeding predetermined overload currents, said electrodynamic forces acting on said contact arm being of sufficient magnitude to overcome force exerted by said spring means and to drive said contact arm in contact opening direction while said drive means remains in said closed position and in so doing move said follower from said first cam section to said second cam section; as said follower passes from said first to said second cam section, said spring means being repositioned to bias said contact arm in contact opening direction and to bias said follower away from said first cam section.

4,488,134

TRANSFORMER WITH WINDINGS COMPLETELY EMBEDDED IN CAST RESIN

Richard Pfeiffer, Stein, Fed. Rep. of Germany, assignor to Transformatoren Union Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Sep. 23, 1982, Ser. No. 422,183
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1981, 3138909
Int. Cl.³ H01F 27/10
U.S. Cl. 336—58 9 Claims



1. Transformer, comprising an iron core, high voltage and low voltage windings, at least one cast resin body completely embedding, holding and insulating said windings, said cast resin body having cooling channels formed therein and having additional channels formed therein being separated from said cooling channels, and insulating gas filling said additional channels, said core having a leg, said low voltage winding having an outer mantle and end faces, said high voltage winding having connecting conductors, said high voltage winding having at least a portion of said cooling channels formed in the interior thereof and being surrounded by at least a portion of said additional gas-filled channels, said low voltage winding being disposed radially between said high voltage winding and said core leg and being surrounded by said additional gas-filled channels at said mantle and end faces thereof, said cast resin body having said cooling channels formed therein being a common body for said iron core and said low voltage winding, and said connecting conductors of said high voltage winding being mainly insulated by said insulating gas.

4,488,135

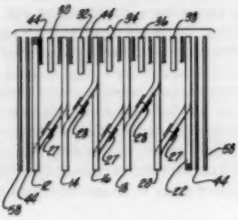
TRANSFORMER FOR WELDING GUN

Charles A. Schwartz, 24545 Bryden Rd., Beachwood, Ohio 44122

Continuation-in-part of Ser. No. 402,890, Jul. 29, 1982,. This application Mar. 7, 1983, Ser. No. 472,596

Int. Cl.³ H01F *27/08*

U.S. Cl. 336—62 **8 Claims**



1. In a transformer of the type adapted to be attached to the arm of a welding gun or the like including a primary winding, a secondary winding, and a core, the improvemment comprising:

said primary winding comprising a plurality of spaced apart coils, said primary winding coils having a hollow interior defining a passage for a coolant therein, said passage being configured to carry a quantity of said coolant which is sufficient to substantially cool both said primary winding and said secondary winding,

said primary winding coils being electrically connected in series and mechanically connected to define a continuous flow path for said coolant;

said secondary winding comprising a plurality of thin flat members spaced apart from each other, said thin flat members being electrically and thermally conductive;

one of said primary coils being disposed in heat transferring relationship between two adjacent spaced apart secondary members so that primary coils and secondary windings are arranged in alternating sequence;

barrier means interposed between each primary coil and each secondary winding for electrically insulating each primary coil from the adjacent secondary winding, said barrier means having a sufficiently high thermal conductivity to allow a substantial portion of the heat generated in said secondary to be transferred through said barrier means to said primary coils;

each primary coil being of a first overall height and a first overall depth;

each secondary member being of substantially the same height and depth as said primary coil;

so that upon flowing a coolant through said primary winding, any heat generated in said transformer secondary winding is conducted through said barrier means to said primary winding and dissipated by the flow of coolant through said continuous flow path such that said transformer primary and secondary are both cooled by the flow of coolant through said primary.

4,488,136

COMBINATION TRANSFORMER WITH COMMON CORE PORTIONS

Irvin L. Hansen, and Randall W. Haack, both of Muncie, Ind., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 264,778, May 18, 1981, abandoned. This application Aug. 23, 1983, Ser. No. 526,205

Int. Cl.³ H01F *27/24*

U.S. Cl. 336—215 **4 Claims**

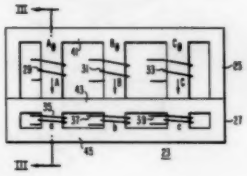
1. A combination main and series transformer having at least one electrical phase, comprising:

a magnetic core having separate main and series winding leg portions, and yoke portions,

a main transformer having windings disposed in inductive relation with said main winding leg portions, including a tapped regulating winding arranged only for boost excitation,

and a series transformer having windings disposed in inductive relation with said series winding leg portions with the excitation of said series transformer being responsive to said tapped regulating winding,

said main winding leg portion having a first yoke and said series winding leg portion having a second yoke, said first



and second yokes having different cross-sectional areas, said leg portions of each electrical phase being physically separated from one another by a yoke portion common to both, with the density of the magnetic flux in the main winding leg portion being constant, said magnetic flux flowing only through the main winding leg portion and associated common yoke portion in the absence of series transformer excitation, and additionally flowing through the associated series winding leg portion and common yoke portion as excitation of the series transformer commences, said common yoke portion being equal in cross section to the larger of two yokes which are combined from the main and series transformers.

4,488,137

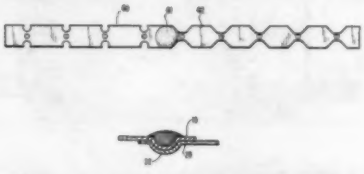
COMPOSITE FUSE LINKS EMPLOYING DISSIMILAR FUSIBLE ELEMENTS IN A SERIES

William J. Rooney, Clifton, and Francis J. Rooney, Ramsey, both of N.J., assignors to Commercial Enclosed Fuse Company, North Bergen, N.J.

Filed Aug. 29, 1983, Ser. No. 527,003

Int. Cl.³ H01H *85/04, 85/12*

U.S. Cl. 337—162 **16 Claims**



1. A composite fuse link for use in a fuse and directed between a first fuse terminal and a second fuse terminal comprising:

a first planar section of a ribbon-like configuration fabricated from a first conductive material and having one end coupled to said first terminal and a second planar section of a ribbon-like configuration fabricated from a second conductive material being a better conductor than said first and having one end coupled to said other end of said first planar section and said other end coupled to said second terminal whereby said first and second planar sections are in series between said first and second terminals, wherein said one end of said second planar member is coupled to said one end of said first planar member by means of a

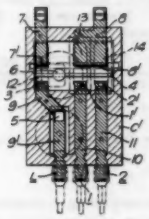
mechanical and electrical bond, wherein said mechanical bond is a "staking" bond formed by indenting said first conductive material into said second conductive material wherein said electrical bond is a solder bond formed by covering said "staked" area with a silver based solder.

4,488,138

THREE-STAGE TEMPERATURE SWITCH, PREFERABLY FOR A HOT WATER HEATER

Thor F. Braathen, N-3358 N. Eggedal, Norway

Filed Oct. 26, 1982, Ser. No. 436,817
Int. Cl.³ H01H *37/52*
U.S. Cl. 337—338 **4 Claims**



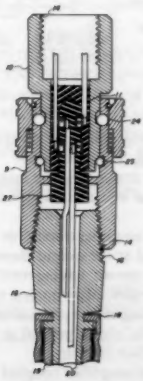
1. A three-stage temperature switch, comprising a casing, an operating thermostat and a safety thermostat connected to the casing, the switch having L-, 1- and 2-branches, an operating contact in the L-branch operable by said operating thermostat, switching contacts in said L-, 1- and 2-branches actuable simultaneously by said safety thermostat at a higher temperature than the temperature at which the operating thermostat actuates said operating contact, and means selectively individually to actuate said switching contacts in said 1- and 2-branches independently of said safety thermostat.

4,488,139

ELECTRICAL CONNECTOR

Hugh H. Snider, Jr., Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 5, 1982, Ser. No. 375,241
Int. Cl.³ H01R *13/648*
U.S. Cl. 339—143 R **11 Claims**



1. An electric connector comprising in combination a multi-element housing containing electrical conduit where the housing is shielded from electrical interference by electrically insulated shielding means comprising:

(a) two coacting outer connector sections that are generally electrically conductive and

(b) means to connect one outer connector section to the other outer connector section by screw threads located on each section and each such section having one termination point and wherein swivel means are provided at one termination point that will withstand rotational flexing of electrical conduits,

(c) two coacting inner connector sections that are within the two outer connector sections and in contact with the said outer connector sections and both inner connector sections are generally electrically insulated and

(d) means to slip fit one inner connector section into the other inner connector section where

(e) one inner connector is fitted with a female receptacle with at least one electrical contact and the other inner connector is fitted with a male plug fitted with an electrical contact and an electrical conduit conected thereto

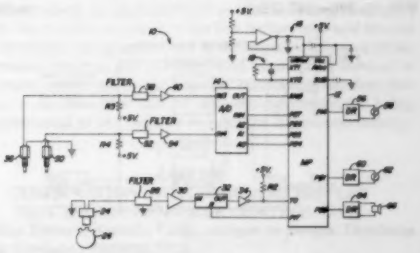
and wherein one outer connector section is joined to one inner connector section by slip fastening the two inner connector sections together and each of said inner connector sections is a freely rotating cylindrical insulated connector element that functions to rotate 360° with respect to its own outer connector the two inner connector sections are joined by slip fitting the first inner connector into a second inner connector section.

4,488,140

CLUTCH TEMPERATURE MONITOR

Stephen P. Lang, Waterloo; Yolanda E. Martin, Cedar Falls, and Patrick E. Pinkston, Traer, all of Iowa, assignors to Deere & Company, Moline, Ill.

Filed May 17, 1982, Ser. No. 379,231
Int. Cl.³ B60Q *1/00*; G08B *23/00*
U.S. Cl. 340—57 **10 Claims**



1. In an engine-driven vehicle having a hydraulic assist-type transmission coupled to the engine by an operator-engageable and disengageable clutch, a clutch monitor system comprising:

a clutch temperature sensor for generating a clutch temperature signal representing a temperature of the clutch;

a transmission temperature sensor for generating a transmission temperature signal representing a temperature of hydraulic fluid in a portion of the hydraulic assist transmission;

means for generating an alarm value derived from the sensed transmission temperature; and

means for generating a warning signal when the sensed clutch temperature is greater than the alarm value.

4,488,141

GLASS PANE FOR AN AUTOMOBILE REAR VIEW WINDOW

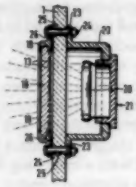
Hans Ohlenforst, Im Johannistag 71, and Werner Gatzweiler, Schutzenstrasse 12, both of D-5100 Aachen, R.F.A., Fed. Rep. of Germany

Filed Jul. 31, 1981, Ser. No. 288,805

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1980, 3032245

Int. Cl.³ B60Q *1/00*; B60B *9/08*

U.S. Cl. 340—97 6 Claims



4. Glass pane for an automobile rear view window having an electric signal light unit rigidly attached thereto, said light unit comprising a colored cover and a bulb housing with said housing being attached to said pane wherein said cover is glued to a surface of said pane adapted to face the outside of an automobile and said housing is attached to a surface of said pane adapted to face the interior of an automobile.

4,488,142

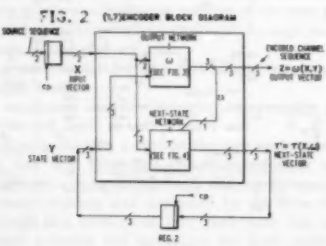
APPARATUS FOR ENCODING UNCONSTRAINED DATA ONTO A (1,7) FORMAT WITH RATE ⅔

Peter A. Franaszek, Katonah, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1981, Ser. No. 336,488

Int. Cl.³ H03K *13/24*

U.S. Cl. 340—347 DD 9 Claims



1. A method for encoding by lookahead a series of unconstrained binary input symbols into a run length limited (1,7) code having a ⅔ rate which comprises consecutively entering one new input symbol (X) comprising 2 bits into a logical tree coding network and simultaneously entering three state bits (Y) which were produced by the encoder during the immediately preceding encoding operation into the same encoding network and producing three channel outputs bits (Z) obeying said (1,7) encoding rules and three next state bits (Y') for use in the next succeeding coding operation, wherein the encoding of a given input symbol X_0 is performed as a function of the next input symbol X_{-1}.

4,488,143

FIXED RATE RUN LENGTH LIMITED (RLL) CODE STRING GENERATION USING LENGTH ORIENTED ARITHMETIC CODE DATA STRING EXPANSION AND DATA STRING RECOVERY USING ARITHMETIC CODE COMPRESSION OF RLL CODE STRINGS

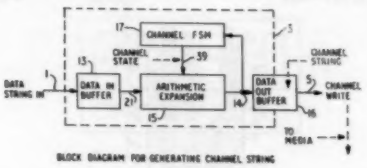
George N. Martin, Winchester, England, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 29, 1982, Ser. No. 393,273

Claims priority, application European Pat. Off., Aug. 7, 1981, 81303614

Int. Cl.³ H03K *13/00*

U.S. Cl. 340—347 DD 3 Claims



1. A method for maintaining representability of symbol strings in the conversion of data strings into fixed rate run length limited (RLL) symbol strings and vis-a-vis, characterized in that the method comprises the steps of:

mapping of each data string into an RLL string by serially applying the data strings to a length oriented arithmetic decoder constrained to ensure a ONE-TO-ONE transformation; and

mapping of each RLL string into a data string by serially applying the RLL string to a length oriented arithmetic encoder constrained to ensure an ONTO transformation.

4,488,144

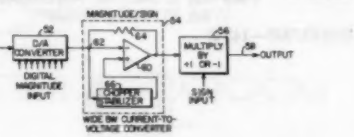
HIGH LINEARITY DIGITAL TO ANALOG CONVERTER

Herbert Wollman, Burlington, Mass., assignor to Analogic Corporation, Wakefield, Mass.

Continuation of Ser. No. 145,629, May 1, 1980, abandoned. This application Apr. 1, 1983, Ser. No. 481,014

Int. Cl.³ H03K *13/02*

U.S. Cl. 340—347 DA 4 Claims



1. A digital-to-analog converter utilizing a magnitude/sign input code comprising in combination:

unipolar means for converting the magnitude portion of the digital input code into a corresponding analog input signal;

a broad bandwidth amplifier circuit for developing an amplified analog signal at the output thereof, said broad bandwidth amplifier circuit having two inputs, one of said inputs being permanently coupled to the output of said unipolar converting means, said circuit having means for minimizing any AC signal present at said one input of said broadband amplifier circuit;

a chopper-stabilized amplifier coupled to the inputs to said broad bandwidth amplifier circuit, said chopper-stabilized amplifier including means coupled to said one input for developing an error signal by sensing substantially only the DC offset of said broad bandwidth amplifier circuit,

said error signal being coupled to the other of said inputs of said broad bandwidth amplifier circuit; and

means for multiplying the amplified analog signal by +1 or −1 responsive to the sign bit of the digital input code.

4,488,145

RESONANT SOUNDER DEVICE FOR PRODUCING MULTIPLE WARNING SOUNDS

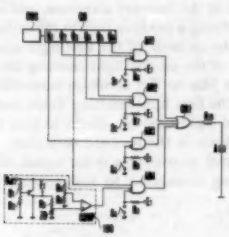
Makoto Katsuma; Kiyoshi Alyfuku; Masaharu Kawamura; Masayoshi Kirchi, all of Kanagawa, and Hiroyasu Murakami, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 31, 1981, Ser. No. 336,496

Claims priority, application Japan, Jan. 16, 1981, 56-5637

Int. Cl.³ G08B *21/00*

U.S. Cl. 340—384 E **2 Claims**



1. A warning device comprising:

(a) a sounder having a resonant frequency and capable, upon being driven at said resonant frequency, of producing a relatively high sound intensity;

(b) an oscillator and a frequency dividing counter, a signal from said oscillator being applied to said frequency dividing counter, said frequency dividing counter producing a plurality of output pulse signals of divided frequencies;

(c) at least two warning signal forming means for indicating warnings by the sound signals of said sounder; and

(d) a circuit for actuating said sounder, said actuating circuit being responsive to the output signals of said frequency dividing counter and said warning signal forming means to indicate warning states by sound signals corresponding to the frequencies from said frequency dividing counter, whereby one of the sound signals for said warning states is made to have a frequency equal or near to the resonant frequency of said sounder.

4,488,146

INFORMATION INPUT AND OUTPUT UNIT FOR DATA PROCESSING EQUIPMENT

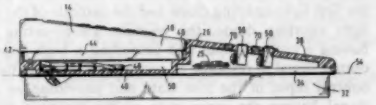
Joachim Burchart, Schlangen, Fed. Rep. of Germany, assignor to Nixdorf Computer AG, Fed. Rep. of Germany

Filed Mar. 15, 1982, Ser. No. 358,159

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1981, 8108980[U]

Int. Cl.³ G09F *9/32*

U.S. Cl. 340—407 **13 Claims**



1. Information input and output unit for data processing equipment, including an input keyboard and a tactile read-out panel with a control keyboard for tactile data display for the vision impaired, characterized in that the input keyboard (14; 14'), the control keyboard (30;30') and the tactile read-out panel (28;28') are arranged in one plane, that the tactile read-out panel (28;28') with the control keyboard (30;30') is in front of the input keyboard (14;14') relative to the operator, and that in front of the tactile read-out panel (28;28') a hand rest surface (102) is provided.

4,488,147

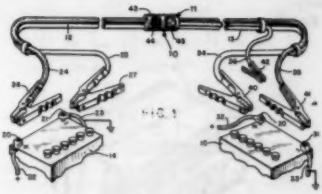
BATTERY JUMPER CABLE SYSTEM

Eugene R. Signorile, Chicago, Ill., assignor to Telecopt Co., Chicago, Ill.

Filed Mar. 15, 1982, Ser. No. 358,022

Int. Cl.³ G08B *21/00*

U.S. Cl. 340—636 **8 Claims**



1. A jumper cable system for interconnecting first and second batteries each having positive and negative polarity terminals, comprising, in combination:

first electrical connector means comprising a first conductor for connecting the positive terminal of the first battery to the positive terminal of the second battery;

second electrical connector means comprising a second conductor for connecting the negative terminal of the first battery to the negative terminal of the second battery; and

signaling means including an alarm device and a diode serially connected between said first and second conductors, and a first additional conductor extending between the juncture of said alarm device and said diode and the negative terminal of said second battery, for providing an alarm upon said first conductor being connected to the negative terminal of the first battery and said second conductor being connected to the positive terminal of the first battery, or upon said first conductor being connected to the positive terminal of the first battery and said second conductor being connected to the negative terminal of the second battery, and the other end of said first conductor being connected to the negative terminal of the first battery or the other end of said second conductor being connected to the positive terminal of the second battery.

4,488,148

COMBINATION SWITCHING AND DISPLAY ELECTRONIC MODULAR CONTROL UNIT

Joachim Kuciera, Arcadia, Calif., assignor to Becton, Dickinson and Company, Paramus, N.J.

Filed Feb. 19, 1982, Ser. No. 349,960

Int. Cl.³ G09G *3/00*

U.S. Cl. 340—700 **9 Claims**

1. A self-contained modular electronic switching unit for use in place of an electromechanical digital switch for controlling equipment comprising:

(a) a casing module;

(b) a display on said module for displaying switch position information to the user;

(c) a microcontroller in said module for coordinating the electrical components of said switching unit in performing the switching function;

(d) a non-volatile random access memory in said module for storing ongoing switching information regarding the switch position and retaining said information in the event

of an electrical power failure so that upon power resumption said information being available for use;

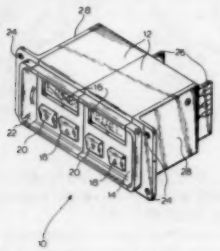
(e) a programmable read-only memory in said module for receiving and storing information regarding the electrical code output for each switch position and the corresponding message for transmission to said display;

(f) a read-only memory serial switch code register in said module for storing information regarding specific locations of information in said programmable read-only memory and directing electrical signals to the specific locations and for providing parallel switch code output signals to control external equipment;

(g) buss means on said module for the electrical connection thereof to equipment to be controlled;

(h) first means for providing flow communication between said microcontroller and said non-volatile random access memory;

(i) said first flow communication means including



(1) a non-volatile random access memory data buss for allowing the transfer of data between said microcontroller and said non-volatile random access memory,

(2) a non-volatile random access memory address buss,

(3) a non-volatile random access memory control buss, and

(4) a serial interface buss for allowing serial input of data into said non-volatile random access memory

(j) second means including address lines for providing flow communication of address information between said programmable read-only memory and said serial switch code register so that address information can be changed or intialized;

(k) third means including data lines for providing flow communication of data between said programmable read-only memory and said serial switch code register so that switch code data can be changed or initialized; and

(l) an output electrically connected to said serial switchcode register for communicating with the equipment being controlled.

4,488,149

ELECTRONIC DISPLAY HAVING SEGMENTS WHEREIN EACH SEGMENT IS CAPABLE OF SELECTIVELY ILLUMINATING TWO COLORS

William A. Givens, Jr., 4815 W. Grove, Apartment 507, Dallas, Tex. 75248

Filed Feb. 26, 1981, Ser. No. 238,553
Int. Cl.³ G09G 3/14
U.S. Cl. 340—762 **7 Claims**

1. An electronic display, comprising:

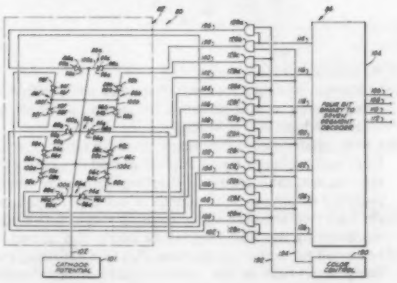
a segment, comprising:

a first light emitting diode having a cathode and an anode and emitting a first color when biased in the forward direction;

a second lignt emitting diode having a cathode and an anode and emitting a second color when biased in the forward direction, the cathode of the first light emitting diode being connected to the anode of the second light emitting diode and the anode of the first light emitting diode being connected to the cathode of the second light emitting diode;

means connected to the segment for selectively biasing one of the first and the second light emitting diodes in the forward direction, said means being connected to the common connection between the anode of the first light emitting diode and the cathode of the second light emitting diode and being connected to the common connection between the cathode of the first light emitting diode and the anode of the second light emitting diode, and said means selectively applying a bias to the common connection between the anode of the first light emitting diode and the cathode of the second light emitting diode and applying a negative bias to the common connection between the cathode of the first light emitting diode and the anode of the seocnd light emitting diode to bias the first light emitting diode in the forward direction, and said means selectively applying a positive bias to the common connection between the cathode of the first light emitting diode and the anode of the second light emitting diode and applying a negative bias to the common connection between the anode of the first light emitting diode and the cathode of the seocnd light emitting diode to bias the second light emitting diode in the forward direction;

a color control providing a color signal, the color control signal being connected to and applied at the common



connection between the anode of the first light emitting diode and the cathode of the second light emitting diode; and

an inverting buffer receiving the color control signal and providing an inverted output signal, the inverted output signal being connected to and applied at the common connection between the cathode of the first light emitting diode and the anode of the second light emitting diode, the first light emitting diode being forward biased in the high state of the color control signal and the second light emitting diode being forward biased in the low state of the color control signal; and

wherein the means for selectively biasing one of the first and the second light emitting diodes is defined further to include:

a tri-state non-inverting buffer receiving the color control signal and providing an output signal connected to and received at the common connection between the anode of the first light emitting diode and the cathode of the second light emitting diode, the tri-state non-inverting buffer having a control input and providing a high impedance output signal in response to receiving a signal at the color control input in the low state and providing an output signal having the same state as the received signal in response to receiving a signal at the control input in the high state; and

wherein the means for selectively biasing the first and the second light emitting diodes is defined further as applying the signal to the control input of the tri-state non-inverting buffer.

4,488,150

DRIVE CIRCUIT FOR VIDEO DISPLAY PANEL

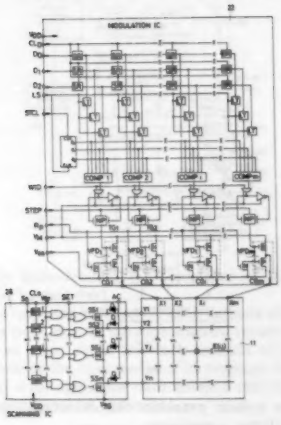
Yoshiharu Kanatani, Tenri, Japan, assignor to Sharp Corporation, Osaka, Japan

Continuation of Ser. No. 166,913, Jul. 8, 1980, abandoned. This application Jun. 28, 1983, Ser. No. 508,414

Claims priority, application Japan, Feb. 26, 1980, 55-23898; Mar. 11, 1980, 55-31132

Int. Cl.³ G09G 3/12

U.S. Cl. 340—781 3 Claims



1. An image display device comprising:

electroluminescent matrix array display means for displaying half-tone images, said display means having crossing scan electrodes and data electrodes which form individual display elements at the intersections therebetween, each display element requiring the application of a voltage greater than a predetermined threshold voltage to vary the brightness of said display to greater than its minimum brightness;

means for providing a video signal to be displayed;

analog-to-digital conversion means for digitalizing the information contained in said video signal to form binary information;

memory means for temporarily storing the binary information produced by said analog to digital conversion means;

digital-to-conversion means responsive to said binary information stored in said memory means for producing discretely valued analog signals differing from the values of said video signal to produce a variation in display brightness substantially uniformly related to the values of said video signal while compensating for said predetermined threshold voltage;

means for applying said discretely valued analog signals to said data electrodes;

scan circuit means for producing and applying pulses to respective ones of said scan electrodes;

each picture element of said display means thereby producing a tone related to the information supplied on said video signal.

4,488,151

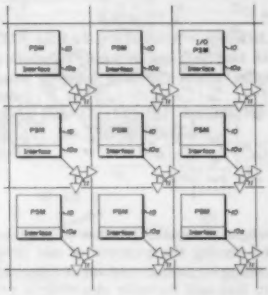
ARBITER SWITCH FOR A CONCURRENT NETWORK OF PROCESSORS

Brent C. Bolton, Austin; Gary L. Logsdon, Round Rock, both of Tex.; Carl F. Hagenmaier, Jr., Pittstown, N.J., and Jesse R. Wilson, Austin, Tex., assignors to Burroughs Corporation, Detroit, Mich.

Filed Dec. 10, 1981, Ser. No. 329,424

Int. Cl.³ H04Q 9/00; H04J 3/02

U.S. Cl. 340—825.5 10 Claims



1. An arbitration switch for receiving digital data signals and a clear signal from two different sources in a digital communication network and transmitting those signals to a designation, said switch comprising:

a pair of input ports one for each of said two different sources to receive said digital data signals and said clear signal from each of said two different sources;

an arbitration circuit means coupled to said input ports to receive said digital data signals and to select the first set of data signals to be received for subsequent transmission to said destination; and

clear circuit means to receive a clear signal from one of said two different sources by way of one of said input ports, said clear circuit means being coupled to said input ports and to said arbitration circuit means to reset said input ports and said arbitration circuit means.

4,488,152

REGISTER POSITION SENSING AND CONTROLLING APPARATUS

John D. Arnason, Toronto, and Michael J. Hampton, Agincourt, both of Canada, assignors to Schlumberger Canada Limited, Toronto, Canada

Filed Feb. 1, 1982, Ser. No. 344,701

Int. Cl.³ G08C 19/10, 19/00

U.S. Cl. 340—870.37 20 Claims

1. Position sensing apparatus comprising:

a stationary main electrode;

a stationary first electrode spaced from said main electrode;

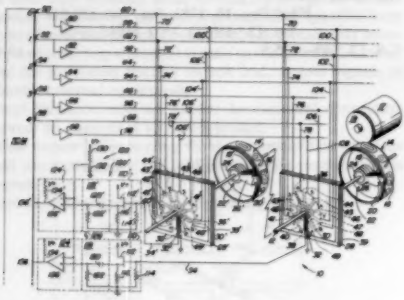
a stationary second electrode spaced from said main and first electrodes;

a movable electrode positionable proximate to and capacitively coupleable with said main and first electrodes or said main and second electrodes;

processing means connected to said main electrode responsive to a capacitively induced signal in said main electrode to provide a processed signal; and

processor means operatively connected to said stationary electrodes and to said processing means including signalling means for providing first or second input signals respectively to said first or second electrodes whereby a signal is capacitively induced in said main electrode when said movable electrode is respectively proximate said first or second electrode;

said processor means including control means for causing said signalling means to provide said first input signal and sensing the presence of said processed signal corresponding to said first input signal to provide an indication that said movable electrode is proximate said first electrode



and causing said signalling means to provide said second signal and sensing the presence of said processed signal corresponding to said second input signal to provide an indication that said movable electrode is proximate said second electrode.

4,488,153

DEVICE FOR WIRELESS DATA TRANSMISSION

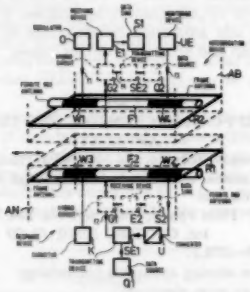
Hans A. Lange, Brunswick, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Nov. 20, 1981, Ser. No. 323,284

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1981, 3101636

Int. Cl.³ G01S *13/78*

U.S. Cl. 343—6.5 SS **3 Claims**



1. Apparatus for wireless data transmission from a data source to a data sink, permitting the storing and/or processing of received data, in a track-bound system, comprising:

a response device including the data source;

an interrogation device including the data sink;

an energy transmitter in said interrogation device;

a converter in said response device;

an interrogation device ferrite rod antenna connected to said energy transmitter and a response device ferrite rod antenna connected to said converter, both ferrite rod antennae arranged in the direction of the track;

a first frame antenna in said interrogation device and a second frame antenna in said response device, each of said frame antennae mounted adjacent the respective ferrite rod antenna and includes a dimension to be operative over the length of influence of the respective ferrite rod antenna;

a data receiving device connected between said first frame antenna and said data sink; and

a transmitting device connected to said second frame antenna, to said converter and to said data source.

4,488,154

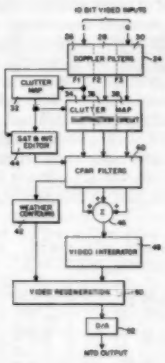
RADAR PROCESSOR

Harold R. Ward, Bedford, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 143,569, Apr. 25, 1980, abandoned. This application Mar. 25, 1982, Ser. No. 361,668

Int. Cl.³ G01S *13/52*

U.S. Cl. 343—9 R **15 Claims**



1. A radar system processor for detecting signals in the presence of clutter comprising:

means for deriving signals from reflections of directively radiated groups of at least three radar pulses in which the interpulse periods in each group are equal;

detector means for extracting components of received signals phase related to said pulses;

means for sampling said components at intervals in time corresponding to ranges of reflections;

means for storing the sequences of samples generated by said sampling means during said interpulse periods;

a plurality of velocity filters;

said filters having means for weighting each sequence of stored samples with weighting coefficients;

at least some of said weighting coefficients being different for different velocity filters; and

means for normalizing the outputs of different ones of said velocity filters as a function of said clutter passing through said different filters.

4,488,155

METHOD AND APPARATUS FOR SELF-CALIBRATION AND PHASING OF ARRAY ANTENNA

Chialin Wu, Pasadena, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jul. 30, 1982, Ser. No. 403,848

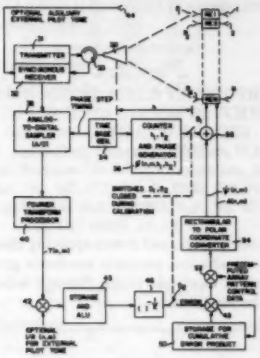
Int. Cl.³ H01Q *3/00*

U.S. Cl. 343—376 **14 Claims**

1. In a phased array antenna incorporating a separate reciprocal phase shifter in the broadcast path from a central feed to each antenna element, each phase shifter being individually controllable, a method for self-calibration and phasing said array elements to compensate for any deviation from a precomputed pattern from an assumed array structure comprising the steps of

broadcasting a continuous coherent reference wave from said feed to said elements, while stopping normal operation and with said phase shifters set to perform a lens operation for said precomputed pattern using said assumed array structure, and receiving at said feed electromagnetic wave energy returned from each phase shifter,

advancing the phase angle of said phase shifters at different rates, thereby providing distinct frequency modulation of returned energy from said phase shifters,



coherently demodulating the composite of return energy received by said feed,

deriving a response function for each antenna element as the Fourier transform of the demodulated return energy,

deriving an error signal for each antenna element as the reciprocal of the square root of its response function, and

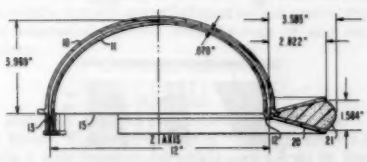
using said error signal for each antenna element for phase compensation of its phase shifter.

4,488,156

GEODESIC DOME-LENS ANTENNA

Edward C. DuFort, and Harold A. Uyeda, both of Fullerton, Calif., assignors to Hughes Aircraft Company, El Segundo, Calif.

Filed Feb. 10, 1982, Ser. No. 347,666
Int. Cl.³ H01Q *19/06, 15/04*
U.S. Cl. 343—754 **11 Claims**



1. An antenna for providing a substantially collimated beam, comprising:

(a) a geodesic lens antenna having two concentric surfaces of revolution about a central axis

(b) feed means for feeding energy into and out of the area between the surfaces of revolution;

(c) an annular flared horn having a first annular conductor coupled to one concentric surface at the periphery thereof and having a second annular conductor coupled to the second concentric surface at the periphery thereof, the annular conductors disposed at a predetermined angle to each other;

(d) an annular dielectric lens disposed between the annular conductors and having, in a plane parallel with the central axis, a cross-sectional shape of a wedge with the tip of the wedge facing towards the central axis, and having an outer surface facing away from the central axis; and

(e) the geodesic lens antenna further being shaped to compensate for the presence of the annular dielectric lens to maintain the collimation of energy which propagates from the feed means through the geodesic lens antenna and through the dielectric lens, in a plane perpendicular to the central axis;

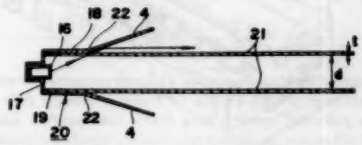
(f) whereby the beam is substantially collimated in two perpendicular planes.

4,488,157

SLOT ARRAY ANTENNA ASSEMBLY

Takashige Terakawa, Yokohama, and Noriyuki Akaba, Tokyo, both of Japan, assignors to Tokyo Keiki Company Limited, Tokyo, Japan

Filed Feb. 22, 1982, Ser. No. 350,739
Int. Cl.³ H01Q *13/10*
U.S. Cl. 343—771 **6 Claims**



1. A slot array antenna assembly comprising:

a member composed of metal wall plates and having a C-shaped side sectional shape;

a slot radiator mounted on a vertical side of said C-shaped member;

a pair of parallel dielectric plates of uniform thickness projected to extend along two parallel sides of said C-shaped member in the direction of the open end thereof, the thickness of each of said dielectric plates being less than about one twentieth of a working wavelength; and

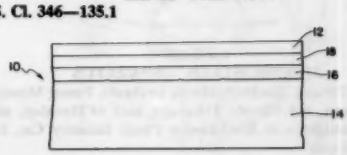
a pair of metal flared reflecting plates connected to open end edges of said C-shaped member and arranged to respectively spread upwardly and downwardly.

4,488,158

ELECTROSENSITIVE RECORDING MEDIUM

Richard C. Wirnowski, Longwood, Fla., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation of Ser. No. 341,676, Jan. 22, 1982, abandoned. This application Nov. 2, 1983, Ser. No. 547,855
Int. Cl.³ G01D *15/34*
U.S. Cl. 346—135.1 **21 Claims**



1. An electrosensitive recording member comprising:

(1) a base support;

(2) a conductive polyester layer on said base support wherein said polyester is derived from (1) di- or tricarboxylic acid or anhydride, or mixtures thereof, and (2) dialcohols; and

(3) a contrasting surface recording layer with respect to said polyester layer and removeable at the temperature developed during passage of marking current through said medium to selectively reveal the underlying contrasting

polyester layer that does not depolymerize when subjected to said marking temperatures during the marking process.

4,488,159

PEN SWITCHING MECHANISM IN DRUM PLOTTERS

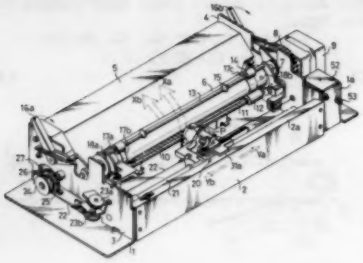
Mitsugu Fujiwara, Morioka; Tomio Aso, Kitakami; Koshiro Kurokawa, Hanamaki, and Hideo Obara, Ezuriku, all of Japan, assignors to Alps Electric Co. Ltd, Tokyo, Japan

Filed Apr. 29, 1983, Ser. No. 489,936

Claims priority, application Japan, May 1, 1982, 57-74232; May 1, 1982, 57-64429[U]

Int. Cl.³ G01D *9/30*

U.S. Cl. 346—139 R **4 Claims**



1. A pen switching mechanism in a drum printer, comprising:

(a) a platen rotatable about its own axis in one and opposite directions;

(b) a shaft extending parallel to said platen;

(c) a pen carriage movably mounted on said shaft in confronting relation to said platen, said pen carriage being movable along said shaft in axial directions of said platen;

(d) a pen holder unit mounted on said pen carriage and supporting a plurality of pens for rotatable movement to bring one of said pens at a time into a writing position;

(e) a hammer operatively mounted on said pen carriage for selectively pressing the pen in said writing position toward said platen;

(f) a ratchet wheel rotatably mounted on said pen carriage for rotation with said pen holder;

(g) a pawl member movably mounted on said pen carriage and operatively engaging teeth of said ratchet wheel for rotating the latter; and

(h) a mechanism coupled with said shaft for angularly moving the latter about its own axis, and having a cam held in engagement with said pawl member for actuating the latter.

4,488,160

ELECTROSTATIC APPARATUS

Noriyoshi Tarumi, Hachioji; Haruo Iwahashi, Fussa; Masahiko Matsunawa, and Hiroshi Tokunaga, both of Hachioji, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

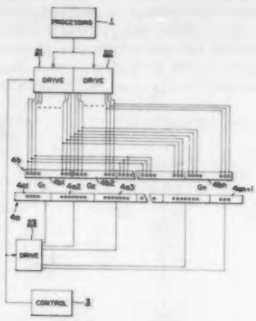
Filed Nov. 30, 1981, Ser. No. 325,852

Claims priority, application Japan, Dec. 12, 1980, 55-174629; Dec. 12, 1980, 55-177531[U]

Int. Cl.³ G01D *15/06*

U.S. Cl. 346—154 **3 Claims**

1. In an electrostatic reproducing apparatus comprising a charged particle modulating electrode unit consisting of an insulating layer, a common electrode and a control electrode sandwiching said insulating layer therebetween, and a plurality of charged particle passing apertures formed through said electrodes and said insulating layer, the improvement comprising forming said common electrode and said control electrode into a plurality of divided groups, respectively, in the direction in which said particle passing apertures are arranged, with each of the thus divided common electrode groups being disposed in a staggered manner with respect to the corresponding



control electrode groups, and means applying the same electric potential to two adjacent common electrode groups opposed to that controlled electrode group through which a charged particle is to be modulated.

4,488,161

ELECTROSTATIC RECORDING HEAD, A METHOD FOR MANUFACTURING THE SAME, AND AN APPARATUS FOR PRACTICING THIS METHOD

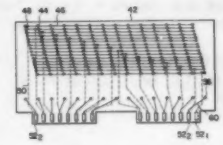
Teruo Tsutsumi, and Masao Hori, both of Tokyo, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

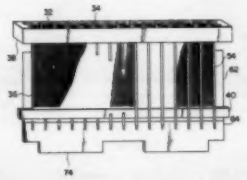
Filed Apr. 13, 1982, Ser. No. 368,089

Claims priority, application Japan, Apr. 15, 1981, 56-55687; Jul. 20, 1981, 56-112096; Jul. 20, 1981, 56-112097; Jul. 29, 1981, 56-117630

Int. Cl.³ G01D *15/06*

U.S. Cl. 346—155 **7 Claims**





1. An electrostatic recording head comprising:

a plurality of recording electrode wires arranged in parallel with constant intervals therebetween in a first plane, each of said recording electrode wires having one end surface establishing a recording head electrode and being coated with a meltable insulating layer with part of said meltable insulating layer being melted;

a plurality of control electrode wires arranged in parallel at constant intervals therebetween in a second plane, said second plane being parallel and close to said first plane of said recording electrode wires, said intervals of said control electrode wires being greater than said intervals of

said recording electrode wires, each of said control electrode wires having one end surface establishing a control electrode, and said control electrodes and recording head electrode defining a third plane; and

a printed circuit board including a plurality of printed lands connected to the respective recording electrode wire at said part of said meltable insulting layer which is melted, a plurality of printed conductors for connecting those printed lands which are connected to every predetermined number of recording electrode wires, and connectors each of which is connected to a respective one of said printed conductors.

4,488,162

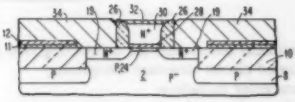
SELF-ALIGNED METAL FIELD EFFECT TRANSISTOR INTEGRATED CIRCUITS USING POLYCRYSTALLINE SILICON GATE ELECTRODES

Chakrapani G. Jambotkar, Hopewell Junction, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 167,172, Jul. 8, 1980, Pat. No. 4,378,627. This application Jan. 3, 1983, Ser. No. 455,370

Int. Cl.³ H01L *29/78, 23/52*

U.S. Cl. 357—23 **13 Claims**



1. A substantially planar self-aligned field effect transistor integrated circuit structure comprising:

a silicon body

a pattern of narrow dimensioned dielectric regions on a major surface of said body;

a gate dielectric layer on the said surface of said body forming a portion of said field effect transistor structure, and between certain of said narrow dimensioned regions;

PN junction regions within said body forming a portion of said field effect transistor structure and in close proximity to and associated with the channel under said gate dielectric layer;

doped polycrystalline silicon gate electrodes on the surface of said gate dielectric layer between certain of said narrow dimensioned regions; and

metal electrical contacts to said PN regions filling spaces between the remaining said narrow dimensioned regions and which contacts are self-aligned to said narrow regions and substantially planar with the tops of said narrow regions.

4,488,163

HIGHLY ISOLATED PHOTODETECTORS

Nathan Bluzer, Silver Spring; Alfred P. Turley, Ellicott City; Francis J. Kub, Pasadena, all of Md., and Gerald M. Borsuk, Washington, D.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 19, 1981, Ser. No. 225,900

Int. Cl.³ H01L *29/78, 27/14, 31/00, 29/06*

U.S. Cl. 357—24 **4 Claims**

1. A sensor for converting radiant energy into electrical signals comprising:

a crystalline substrate having a predetermined crystalline orientation and an upper surface and lower surface;

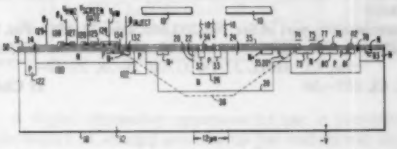
said upper surface adapted for passing radiant energy into said substrate;

a first region of a first conductivity type positioned below said upper surface for receiving and absorbing a portion of said radiant energy;

a second region of a second conductivity type positioned below said first region and forming a first P-N junction with said first region at a first predetermined depth below said upper surface;

said first and second regions having portions thereof physically separated to form a plurality of detectors by grooves in said substrate, said grooves extending from said upper surface towards the lower surface and having side walls bounded by selected crystalline planes of said substrate for electrically and optically isolating each of said plurality of detectors;

a third region of a first conductivity type positioned below said second region and forming a second P-N junction with said second region at a second predetermined depth below said upper surface, and first, second and third region exhibiting bipolar transistor action at times said first P-N junction is forward biased;



means for detecting the peak voltage of said first region with a shift register coupled to said means for detecting the peak voltage, and which peak voltage detecting means includes a charge coupled device having means for injecting charge into a channel having electrodes over said channel for controlling the flow of charge in said channel, and a P region adjacent the charge injecting means forming a first potential barrier, and wherein one of said electrodes over said channel of said charge coupled device forms a second potential barrier separated from said first potential barrier by a first holding well and having a second holding well on the other side of said second potential barrier.

4,488,164

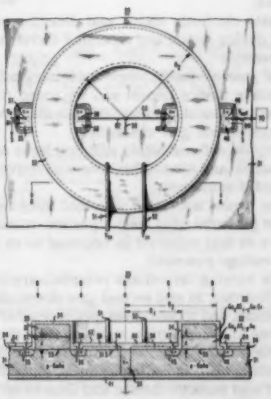
QUANTIZED HALL EFFECT SWITCHING DEVICES

Rudolf F. Kazarinov, Martinsville, and Sergey Luryi, New Providence, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 10, 1982, Ser. No. 387,227

Int. Cl.³ H01L *27/22, 25/04, 45/00, 29/82*

U.S. Cl. 357—27 **14 Claims**



1. A quantized Hall effect switching element comprising means for establishing and gate means for interrupting quan-

tum percolation of electrical current, said means for establishing including:

a pair of solid layers physically contacting each other at an interface having a closed ring geometry configuration at which during operation an inversion layer forms, said inversion layer having a zero resistance state when subjected to a predetermined magnetic field at a predetermined temperature, said solid layers comprising a first solid semiconductor layer upon which another solid layer has been grown, a pn junction in the first solid layer contiguous with an outer edge of the ring.

4,488,165

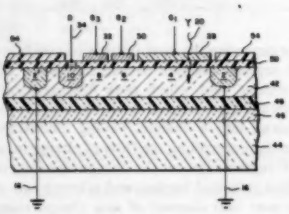
EXTRINSIC INFRARED DETECTOR WITH A CHARGE RESET FUNCTION

Michael A. Levine, 383 Sycamore Pl., Sierra Madre, Calif. 91024

Continuation-in-part of Ser. No. 333,465, Dec. 22, 1981, Pat. No. 4,433,343. This application Mar. 15, 1982, Ser. No. 357,866

Int. Cl.³ H01L *27/14, 31/00, 29/78, 29/12*

U.S. Cl. 357—30 **15 Claims**



1. An extrinsic photon detector device comprising:

a semiconductor substrate of a first conductivity type;

a first layer of semiconductor material of a second conductivity type above said substrate;

drain means defined within said first layer of semiconductor material of said second conductivity type,

an active device region defined within said first layer of semiconductor material, said active device region comprising a detector portion and an integrating portion;

impurities of said second conductivity type extending throughout said detector portion for absorbing photons having predetermined wavelength characteristics in the infrared;

a first gate electrode above said detector portion of said active device region and separated therefrom by a dielectric material;

a second gate electrode above said integrating portion of said active device region and separated therefrom by a dielectric material, said second gate electrode being adjacent to said first gate electrode;

a third region defined within said first layer of semiconductor material and located between said active device region and said drain means;

third gate means associated with said third region for altering the potential of at least a portion of said third region relative to said substrate in response to an externally applied voltage potential;

means for varying the voltage potentials applied to said first gate electrode, to said second gate electrode, to said third gate means, and to said drain means relative to that of said substrate to cause carriers resulting from the absorption of photons in said detector portion to be collected in said integrating portion during an integrating stage of operation of said detector device and then to be transferred to said drain means via said third region during a readout stage of operation, and also to cause replenishment carriers from said drain means to flow via said third region into said active device region during a fill stage of operation and to neutralize any photo-induced space charge in said active device region resulting from said integrating and read-out stages and any excess of said replenishment carriers to be drained off during a spill stage of operation, said fill and spill stages together constituting a charge reset function to facilitate a subsequent said integrating stage.

4,488,166

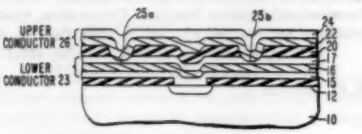
MULTILAYER METAL SILICIDE INTERCONNECTIONS FOR INTEGRATED CIRCUITS

William I. Lehrer, Los Altos, Calif., assignor to Fairchild Camera & Instrument Corp., Mountain View, Calif.

Division of Ser. No. 214,615, Dec. 9, 1980, Pat. No. 4,398,335. This application Apr. 11, 1983, Ser. No. 484,070

Int. Cl.³ H01L *23/54, 21/283, 21/44*

U.S. Cl. 357—71 **9 Claims**



1. An electrical connection for connecting two conductors in an integrated circuit structure comprising:

a first conductor including:

a first lower layer of polycrystalline silicon;

a first intermediate layer of metal deposited on the first lower layer and reactable with the lower layer of polycrystalline silicon to form a metal silicide; and

a first upper layer of polycrystalline silicon deposited on the first intermediate layer of metal;

a layer of insulating material disposed over all of the upper layer of polycrystalline silicon except for a contact region where the electrical connection is desired;

a second conductor including:

a second lower layer of metal deposited across the layer of insulating material and onto the contact region to form a metal silicide by reaction with the first upper layer of polycrystalline silicon, and thereby form the electrical connection; and

a second upper layer of polycrystalline silicon deposited onto the second lower layer of metal and reactable therewith to form a metal silicide.

4,488,167

CURRENT CONVERTER ASSEMBLY IN A FLAT HOUSING

Arno Neidig, Plankstadt; Hübert Hettmann, Hockenheim; Bernd Leükel, Weinheim, and Rolf Rief, Mannheim, all of Fed. Rep. of Germany, assignors to Brown, Boveri & Cie AG, Mannheim-Kafertal, Fed. Rep. of Germany

Filed Jul. 9, 1982, Ser. No. 396,655

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1981, 3127456

Int. Cl.³ H01L *21/52, 21/58, 23/32, 25/02*

U.S. Cl. 357—74 **6 Claims**

1. Current converter assembly, comprising a parallelepipedal housing having an upper surface and an interior being filled with a hardened cast insulating compound; said housing including: a flat frame having an open top and bottom, a rectangular edge section extended all around said frame, a rib extended all around said frame toward the interior thereof at substantially the middle of said edge section, and steadying struts disposed on said rib; and a ceramic plate having a surface facing the interior of said housing and having outer dimensions corresponding to the length and width of said flat frame, conducting copper foils disposed on said surface of said ceramic plate facing the interior of said housing; semiconductor chips

being soldered on said copper foils; connecting straps connecting said semiconductor chips to each other; and connecting elements being extended out of said housing from said ceramic

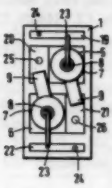


plate in a direction perpendicular to said ceramic plate, said connecting elements being retained by said steadying struts and being freely accessible from the upper surface of said housing.

4,488,168

VECTOR SCOPE

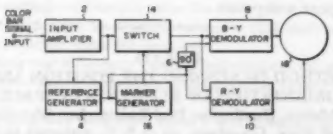
Yoshikatu Mino, Kanagawa, Japan, assignor to Leader Electronics Corp., Yokohama, Japan

Filed Sep. 8, 1981, Ser. No. 300,409

Claims priority, application Japan, Mar. 27, 1981, 56-44833

Int. Cl.³ H04N *9/46, 9/62*

U.S. Cl. 358—10 **17 Claims**



1. Apparatus for measuring amplitude distortion and phase distortion of a subcarrier of a color television signal transmitted through a transmission system, comprising:

detector means connected to receive a transmitted color bar signal through the transmission system for detecting a carrier chrominance signal;

means coupled to said detector means for generating a reference subcarrier signal from a color burst of the detected carrier chrominance signal;

marker generator means coupled to said means for generating a reference subcarrier signal for generating a reference carrier chrominance signal which includes a signal determining an amplitude error level and a phase error level of each of vectors of color signals which are derived from color difference signals of the transmitted color bar signal;

switch means connected to receive said carrier chrominance signal and said reference carrier chrominance signal for alternately outputting said carrier chrominance signal and said reference carrier chrominance signal;

demodulator means connected to receive said reference subcarrier signal and the output from said switch means for generating a demodulated signal; and

display means for displaying in vector the demodulated signal from said demodulated means.

4,488,169

DIGITAL CHROMAKEY APPARATUS

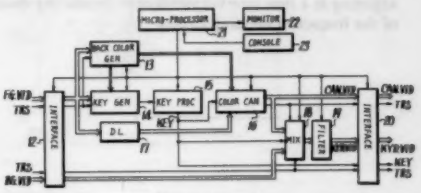
Kaichi Yamamoto, Zama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jul. 8, 1982, Ser. No. 396,339

Claims priority, application Japan, Jul. 9, 1981, 56-107420; Jul. 9, 1981, 56-107421

Int. Cl.³ H04N *9/535*

U.S. Cl. 358—22 **13 Claims**



1. A digital chromakey apparatus for use in providing a single display of selected portions of first and second digital video signals, comprising means for generating a digital key signal in response to specified chroma information contained in said first digital video signal, means for mixing said first digital video signal with said second digital video signal in response to said generated digital key signal and, means for adjusting said digital key signal so as to selectively control the location in time of a leading edge and trailing edge of said digital key signal, said means for adjusting including means for detecting said leading edge and trailing edge of said digital key signal and level control means for selectively altering amplitude levels of said leading edge and trailing edge of said generated key signal in response to external commands of expansion or compression.

4,488,170

SYNCHRONIZING CIRCUIT FOR A TELEVISION RECEIVER

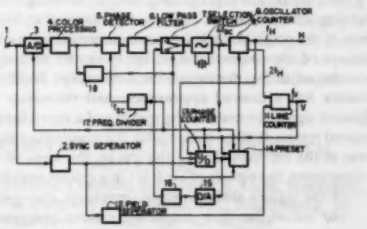
Antonius H. H. J. Nillesen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 12, 1982, Ser. No. 397,391

Claims priority, application Netherlands, Jul. 21, 1981, 8103437

Int. Cl.³ H04N *9/49, 5/12, 5/04*

U.S. Cl. 358—26 **11 Claims**



1. A synchronizing circuit for a television receiver comprising:

a synchronizing-separating stage for deriving line and field synchronizing pulses from a received television signal,

a crystal controlled oscillator for generating a periodic clock signal, the frequency of which is substantially higher than the line frequency of said television signal,

a frequency divider circuit connected to the oscillator for deriving a deflection drive signal for a line deflection

circuit at the line frequency by dividing the clock frequency by a divisor, and

a phase comparison stage for determining the phase deviation between the received line synchronizing pulses and a locally generated reference signal having the line frequency, the phase comparison stage establishing during a predetermined number of line periods the average value of the phase deviation between the signals applied to it, and for supplying the value obtained to a preset stage for adjusting in a time interval subsequent thereto the divisor of the frequency dividing circuit.

4,488,171

IMAGE REPRODUCTION

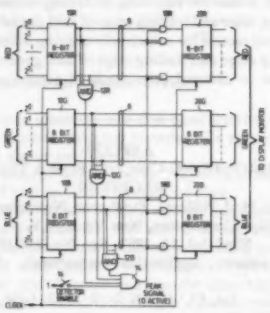
Peter C. Pugsley, Pinner, and Leonard Preston, London, both of England, assignors to Crosfield Electronics Limited, London, England

Filed Nov. 24, 1982, Ser. No. 444,114

Claims priority, application United Kingdom, Nov. 25, 1981, 8135537

Int. Cl.³ H04N *1/46*

U.S. Cl. 358—76 **7 Claims**



1. In a method of reproducing an original image, comprising deriving sets of electric signals representing colour components of the original, each set representing the appearance of an element of the original image, applying the said signals to a monitor, adjusting the signals until the image displayed on the monitor has a desired appearance, and thereafter using the adjusted signals to control the making of a reproduction of the original image, further comprising, for controlling the zero-ink areas in the reproduction of the image, the steps of:

combining the signals of each set in a circuit which, when all of the signals simultaneously represent zero-printing colour values for their respective colour components, provides a zero-ink recognition signal for the corresponding picture element;

modifying each such recognised set of signals so that the corresponding areas of the image are shown on the monitor in a predetermined distinctive colour;

adjusting the signals derived from the original to cause only those portions of the image for which the zero-ink condition is desired to be reproduced on the monitor in the said predetermined colour;

and thereafter using the adjusted signals to control the making of the reproduction.

4,488,172

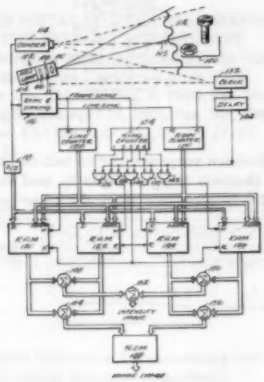
METHOD AND APPARATUS FOR RANGE IMAGING

Richard A. Hutchin, Marlboro, Mass., assignor to Novon, Inc., Swampscott, Mass.

Filed Aug. 18, 1982, Ser. No. 409,344

Int. Cl.³ H04N *7/18*

U.S. Cl. 358—107 **42 Claims**



1. Apparatus for imaging a scene comprising:

means for illuminating said scene with a single moving periodic modulation pattern;

means, offset from said illuminating means, for converting light reflected from a plurality of points in said scene into electrical signals; and

means for determining the relative phase with respect to said periodic modulation pattern of light reflected from each of said points in said scene using a plurality of said electrical signals for each of said points generated at different times, said relative phase being related to the relative range of said points.

4,488,173

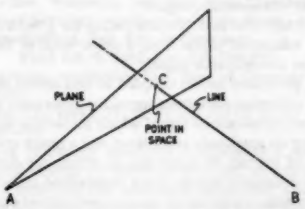
METHOD OF SENSING THE POSITION AND ORIENTATION OF ELEMENTS IN SPACE

Paul Di Matteo, Huntington; Paul Rademacher, Glen Head, and Howard Stern, Greenlawn, all of N.Y., assignors to Robotic Vision Systems, Inc., Hauppauge, N.Y.

Continuation-in-part of Ser. No. 294,341, Aug. 19, 1981, Pat. No. 4,396,945. This application Feb. 4, 1983, Ser. No. 463,971

Int. Cl.³ H04N *7/18*; G01B *11/00*

U.S. Cl. 358—107 **5 Claims**



1. A method of sensing the positional orientation of elements in space, comprising the steps of: providing a plurality of light sensors on an element which is movable in space; said element comprising a transparent plate having patterns projected thereon; providing a pair of light projectors at positions spaced from said element; directing light beams from said projectors at said light sensors; modulating the angular position of said light

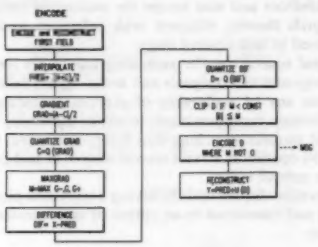
beams over time; and correlating the time of illumination of each sensor with the position of the projected beam at the time of such illumination, so as to determine the angular position of each sensor with respect to each of said projectors.

4,488,174

METHOD FOR ELIMINATING MOTION INDUCED FLICKER IN A VIDEO IMAGE

Joan L. Mitchell, Ossining, and William B. Pennebaker, Carmel, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 1, 1982, Ser. No. 383,406
Int. Cl.³ H04N *7/13*
U.S. Cl. 358—136 **15 Claims**



1. In a multifield display system, wherein previous field data has been encoded and reconstructed, and wherein a value for each pel in a subsequent field has been predicted from information already encoded,

a method of suppressing motion induced flicker and of compressing data in fields subsequent to said previous field in a displayed image, comprising the steps of:

(a) calculating a gradient value for each pel in said subsequent field from said encoded values of corresponding pels

(b) calculating a difference value for each pel in said subsequent field from an original value for said each pel and said predicted value for each pel;

(c) limiting said difference value to said gradient value if said gradient value is less than a predetermined value for each pel;

(d) encoding said difference value if said gradient value for said pel is not equal to zero; and

(e) reconstructing an image of said subsequent field from said predicted value for each pel and said encoded difference value for each pel.

4,488,175

DPCM VIDEO SIGNAL PROCESSING TECHNIQUE WITH SPATIAL SUBSAMPLING

Arun N. Netravali, Westfield, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 28, 1982, Ser. No. 392,558
Int. Cl.³ H04N *7/13*; H03K *13/22*
U.S. Cl. 358—136 **16 Claims**

1. Apparatus for reconstructing the intensity values of non-transmitted pels in a spatially subsampled DPCM encoder, including:

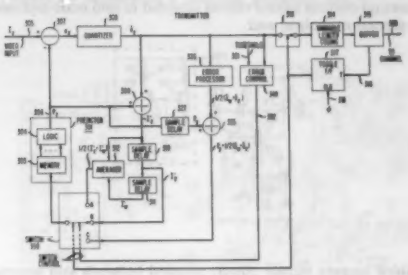
means for predicting the intensity value of each pel as a function of at least one stored reconstructed intensity value for a previously processed pel,

means for forming a quantized error value representing the difference between the intensity value of each pel and the predicted intensity value thereof, and

means for forming reconstructed intensity values for transmitted pels by combining each predicted intensity value with the corresponding quantized error value,

characterized in that said apparatus further includes:

first means operative to form the reconstructed intensity value for a nontransmitted pel by combining its predicted



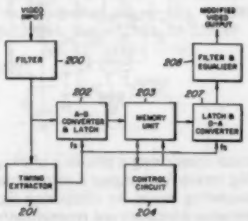
intensity value with the quantized error value of at least one neighboring transmitted pel.

4,488,176

METHOD OF AND APPARATUS FOR MODIFYING A VIDEO SIGNAL TO INHIBIT RECORDING THEREOF

John A. Bond; Yuan-Lu Li, both of Ottawa, and Leslie J. Crane, Nepean, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Continuation-in-part of Ser. No. 246,878, Mar. 23, 1981, Pat. No. 4,390,898. This application Oct. 8, 1981, Ser. No. 309,593
The portion of the term of this patent subsequent to Jun. 28, 2000, has been disclaimed.
Int. Cl.³ H04N *5/38*
U.S. Cl. 358—141 **11 Claims**



1. A method of modifying a video signal to inhibit recording thereof whilst permitting a television receiver to display a video picture in response to the modified video signal, comprising varying the length of fields of the video signal to produce the modified video signal with a varying field length.

4,488,177

T.V. INTEGRATOR CIRCUIT AND HORIZONTAL OSCILLATOR

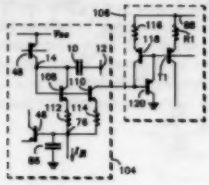
Geoffrey W. Perkins, Chandler, and Gerald K. Lunn, Scottsdale, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 19, 1982, Ser. No. 442,938
Int. Cl.³ H04N *5/04*
U.S. Cl. 358—158 **4 Claims**

1. An improved vertical integrator circuit of the type which includes a first capacitor, first and second current sources for alternately charging and discharging said first capacitor, and a first current mirror circuit having at least first and second current paths coupled to said first and second current sources respectively, said improved vertical integrator for use in conjunction with an oscillator which is equipped with a second capacitor coupled between an output of said oscillator and a reference current node, the improvement comprising:

current mirror means for extracting a current representative of said reference current, said current mirror means comprising:

a second current mirror circuit coupled to said node and said second capacitor; and



a third current mirror circuit coupled between said second current mirror circuit and said first and second current sources for receiving from said second current mirror circuit said current representative of said reference current.

4,488,178

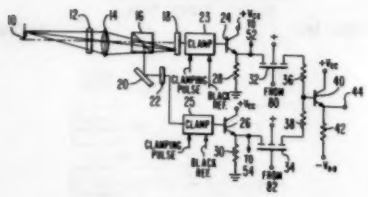
CCD DEFECT CORRECTION WITHOUT DEFECT LOCATION MEMORY

Joshua L. Koslov, and Theodor M. Wagner, both of Princeton, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 24, 1982, Ser. No. 444,357

Int. Cl.³ H04N *5/14, 3/14*

U.S. Cl. 358—163 **6 Claims**



2. An apparatus comprising a plurality of imagers subject to defects, imaging means for imaging a scene onto said plurality of imagers, comparing means for comparing signals from said imagers to determine which are not representative of the scene due to said defects, and adding means for adding said signals together to form an output signal except when a signal from a defect is present and when said signal from a defect is present blocking said signal derived from a defect from forming said output signal.

4,488,179

TELEVISION VIEWING CENTER SYSTEM

H. Eckhard Krüger, Hildesheim-Sorsum; Bernd Freienstein, Hildesheim, and Thomas Schäfer, Schellerten, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Sep. 23, 1981, Ser. No. 304,982

Claims priority, application Fed. Rep. of Germany, Sep. 27, 1980, 3036552

Int. Cl.³ H04N *5/50, 5/44*

U.S. Cl. 358—181 **1 Claim**

1. A television viewing center system having capability for receiving, along with radio-transmitted television signals, supplementary information signals radiotransmitted with the television signals from the same transmitter and relating to transmitted television signals, comprising, in combination:

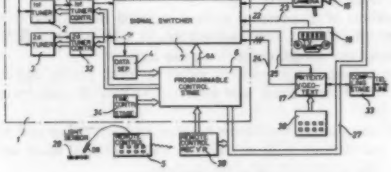
a receiving stage for receiving television signals from a remote source by cable or an antenna, said stage including first and second television reception tuners (2,3) and tuner control means (31,32,37) for controlling the tuning of said tuners;

a data separateion stage (4) connected for receiving the output of said second tuner (3);

a programmable control stage (6,47) having three outputs and first, second and third inputs responsive to digital signals received from said data separation stage (4) and to other digital signals supplied from at least one source (30,34) within the viewing center system, for providing control signals from a first of said outputs to said tuner control means (31,32,37) and from a second and a third of said outputs to other components of the system, said programmable control stage including means for causing said second tuner to scan stepwise a set of receiving channels for obtaining said supplementary information signals therefrom and also means for evaluating supplementary signals thereby obtained with reference to information stored in said control stage;

a signal source transfer switching unit (7,47) for switching composite video signals and audio signals related thereto from any of a plurality of sources, including said first television reception tuner, to any of a plurality of outputs, said transfer switching unit being connected, for control of its operation, to said second output of said programmable control stage;

a television display unit (8) having a television picture screen (9) and connected to an output of said transfer switching unit;



means responsive to data separated from the output of said second television reception signals through said transfer switching unit to said television display unit (8) for displaying supplementary information on the television screen (9) thereof;

a sound reproduction system including at least one loudspeaker and at least one audio amplifier (10,11,12) and connected to an output of said transfer switching unit;

means for recording and reproducing television signals (13,14), connected to an output and to an input of said transfer switching unit;

a plurality of additional television signal sources (15,16,17) connected respectively to a plurality of inputs to said transfer switching unit;

output digital data bus means connecting said third output of said programmable control stage (6,47) for control purposes of said television display unit (8), said sound reproduction system (10,11,12), said television recording and reproducing means (13,14) and said additional television signal sources (15,16,17);

a remote control receiver (30), having its output connected with an input of said programmable control stage, for providing signals including signals to be stored in said programmable control stage, and

remote control manually operable programmable means (5), for providing signals to said remote control receiver (30) from locations in the general vicinity of said receiver, having therein means for sensing the display of said supplemental information on said screen for supplying said

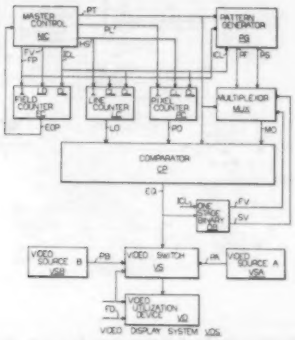
information through said remote control receiver (30) to said programmable control stage, and means for producing a controllable cursor signal for selecting supplementary information displayed on said screen in response to digital signals provided by said data separation stage (4) and causing the information selected by said cursor to be provided as an input to said programmable control stage.

4,488,180

VIDEO SWITCHING

David B. Rabinowitz, Valley Stream, N.Y., assignor to Chyron Corporation, Melville, N.Y.

Filed Apr. 2, 1982, Ser. No. 364,901
Int. Cl.³ H04N 5/22
U.S. Cl. 358—183 **6 Claims**



1. Method of switching between two video sources to a video signal utilization device which displays video information by intensity modulating generated video signal on a television raster of lines and frames forming fields comprising storing digital values representing pixel positions on the field when a switch is to occur from one video source to another, counting representations of pixels during the generation of the raster, comparing the counted representations with the stored representations, and switching from said one video source to said other when an equality of said representation exists.

4,488,181

ELECTRON BEAM SUPPRESSION CIRCUIT FOR A TELEVISION RECEIVER

Peter E. Haferl, Adliswil, Switzerland, assignor to RCA Corporation, New York, N.Y.

Filed Oct. 14, 1982, Ser. No. 434,315
Claims priority, application United Kingdom, Apr. 23, 1982, 8211831
Int. Cl.³ H04N 5/30
U.S. Cl. 358—220 **18 Claims**

1. An electron beam suppression circuit for a television display system, comprising:

a picture tube having a display surface and a plurality of electrodes;

a source of potential for energizing at least one of said plurality of electrodes to generate an electron beam that impinges on said display surface;

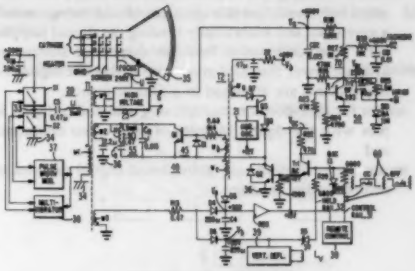
a deflection winding;

a deflection generator coupled to said deflection winding for generating scanning current therein to produce a sweep of said electron beam across said display surface;

means for developing a command signal having first and second states;

means including a first switch coupled to said deflection generator and responsive to said command signal for disabling normal generation of said scanning current to inhibit normal sweep of said electron beam upon the occurrence of the first state of said command signal;

means for developing a blocking potential; and



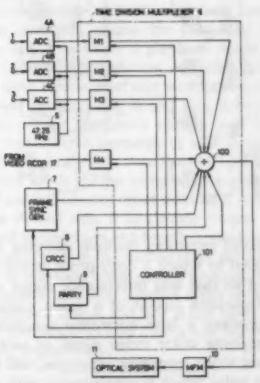
means including a second switch responsive to said command signal and coupled to said one electrode for applying thereto said blocking potential upon the occurrence of said first state of said command signal to suppress generation of said electron beam.

4,488,182

SYSTEM FOR RECORDING AND REPRODUCING TIME-DIVISION MULTIPLEXED DIGITAL AUDIO AND VIDEO SIGNALS

Nobuaki Takahashi, Yamato; Seiichi Takashima, Ayase; Takeshi Shibamoto, Sagamihara; Fujio Suzuki, Machida, and Kohji Tanaka, Tokyo, all of Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan

Filed Sep. 1, 1982, Ser. No. 413,824
Claims priority, application Japan, Sep. 4, 1981, 56-139567; Sep. 4, 1981, 56-139568; Sep. 4, 1981, 56-139569
Int. Cl.³ H04N 9/493
U.S. Cl. 358—310 **14 Claims**



1. A digital recording system comprising:

means for generating still-picture primary color video signals which occur within a frame of interlaced odd-number and even-number fields according to one of the standard line scan formats;

a matrix circuit for converting said primary color video signals into a luminance component and color difference components;

means for converting each of multi-channel analog audio signals into a sequence of digital samples of an audio signal;

means for converting each of said luminance and color difference components to a sequence of digital samples of a video component;

storage means having a plurality of storage areas;

means for writing the digital samples of said video components into respective storage areas of said storage means at a given rate and sequentially reading the digital samples of each video component from the respective storage areas at a rate lower than said given rate so that the digital video components are arranged in a time sequence;

means for time-division multiplexing said audio digital samples with the digital samples of said video components; and

means for recording said multiplexed digital samples on a recording disc medium.

4,488,183

COPY-PROOF RECORDING MEDIUM AND DEVICE FOR ADDING COPY-PROOF INTERFERENCE SIGNAL

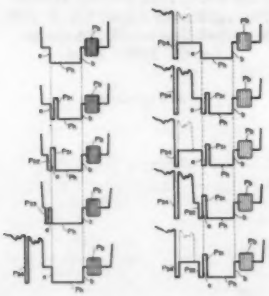
Hisao Kinjo, Yokohama, Japan, assignor to Victor Company of Japan, Limited, Yokohama, Japan

Filed Oct. 21, 1981, Ser. No. 313,691

Claims priority, application Japan, Oct. 27, 1980, 55-150437; Oct. 29, 1980, 55-151818

Int. Cl.³ H04N 7/16, 5/76

U.S. Cl. 358—319 **12 Claims**



1. A copy-proof recording medium carrying a composite color video signal to which a copy-proof interference signal has been added so that said interference signal will cause a synchronous separation circuit of a video signal recording apparatus to produce a false horizontal synchronous signal when said composite color video signal of said medium is recorded by said video recording apparatus, said interference signal having a pulse which is synchronous with a horizontal synchronous pulse of said composite color video signal, said pulse of said interference signal having a width considerably smaller than the pulse width of the horizontal synchronous signal of said composite color video signal, said interference signal being added in at least one particular place, within the horizontal synchronous signal, at a position which precedes a midway point of the horizontal synchronous signal, said interference signal being a positive-going pulse which rises from the level of the tip of the horizontal synchronous signal to a level equal to or greater than the pedestal level, the position, the amplitude and the width of said pulse of said interference signal being maintained constant.

4,488,184

VIDEODISC PLAYBACK SYSTEM

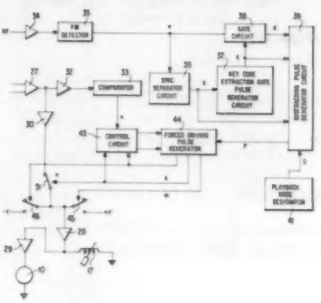
Hirotaka Kurata, Tokyo, Japan, assignor to Trio Kabushiki Kasha, Japan

Filed Nov. 30, 1981, Ser. No. 326,004

Claims priority, application Japan, Dec. 19, 1980, 55-180037

Int. Cl.³ H04N 0/00

U.S. Cl. 358—342 **4 Claims**



1. A videodisc playback system for playing back a videodisc on which there are recorded on a spiral track, between horizontal synchronizing signals in the vertical retrace time, key code signals corresponding to the field, frame or track numbers, said playback system comprising

a playback mode designator (41) to select a playback mode from different playback modes including a normal playback mode,

means for rotating said videodisc,

reading means for reading video information signals recorded on said spiral track of the rotating videodisc,

shifting means for shifting said reading means in a playback shifting direction along a radial of said disc;

tracking means for tracking said spiral track according to the mode selected by said playback mode designator,

first and second memories into which consecutively read key code signals are alternately read for temporary storage,

shifting pulse generator means for generating at least one shifting pulse where the number of shifting pulses generated (a) corresponds to a number of tracks undesirably travelled by the reading means in the direction opposite to the playback shifting direction and (b) is derived from the difference between the stored key code signals in said first and second memories during a expanded vertical blanking time where said expanded vertical blanking time is a period of time greater than the blanking zone of the standard vertical synchronizing signal of said video information signal; and

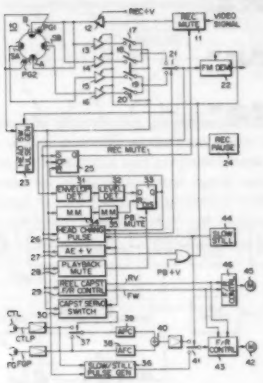
forced driving means responsive to said shifting pulses for controlling said shifting means to forcibly shift the reading means one track at a time in the playback shifting direction for each shifting pulse to thus position the reading means so as to compensate for its undersirable travel in the direction opposite the playback shifting direction;

whereby image jitter is avoided since the shifting pulses and track correction may occur at anytime during the expanded vertical blanking time.

4,488,185
ASSEMBLE EDITING SYSTEM FOR VIDEO TAPE RECORDER

Akira Toba, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jul. 21, 1982, Ser. No. 400,404
Claims priority, application Japan, Jul. 22, 1981, 56-114709
Int. Cl.³ H04N 5/782; G11B 27/02
U.S. Cl. 360—14.1 5 Claims



1. An assemble editing system for a video tape recorder which has first and second video heads disposed on a rotary disc at an interval of 180° for sequentially recording a video signal for each field as a single skewed video track on a magnetic tape and for sequentially reproducing therefrom the video signal for each field, comprising:

a sub-head disposed on said rotary disc at predetermined intervals with respect to said first and second rotary video heads;

recording pause means responsive to a recording pause operation given by an operator during a recording mode for generating a recording pause signal until the recording pause operation is released;

recording mute means responsive to the recording pause signal for interrupting the supply of the video signal to said first and second video heads at a timing that a video recording by said first video head is completed;

means for rewinding the magnetic tape for a given time interval in response to the recording pause signal;

means for running the magnetic tape in the forward direction in response to a recording pause release operation given after the magnetic tape has been rewound for the given time interval;

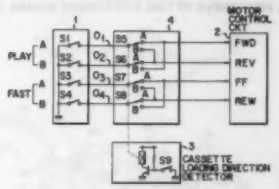
final track detecting means for detecting, after the start of running of the magnetic tape in the forward direction, the final track of a previous recording pattern that is recorded on the magnetic tape by said first video head in accordance with the level of a reproduced output signal of said sub-head which traces video tracks recorded during the recording mode; and

recording mute releasing means responsive to detection of the final track of the previous recording pattern for causing said recording mute means to restart the supply of video signal to said first and second video heads at a timing that a new video track is started to be recorded by said second video head which is adjacent to the final video track recorded by said first video head.

4,488,186
TAPE RUN CONTROL DEVICE FOR MICROCASSETTE TAPE RECORDER

Nobuo Terui, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Nov. 22, 1982, Ser. No. 443,455
Claims priority, application Japan, Dec. 1, 1981, 56-179365[U]
Int. Cl.³ G11B 5/008, 15/00
U.S. Cl. 360—71 3 Claims



1. A magnetic tape run control device for an auto-reverse cassette type tape recorder, the cassette having sides A and B, comprising:

an operation section having operation members for designating a side A playback mode, side B playback mode, side A fast mode and side B fast mode and arranged to, when an operation member is operated, provide an operation signal to a corresponding output terminal;

a motor control circuit having a first control input terminal for normal forward run, second control input terminal for normal reverse run, third control input terminal for fast forward run and fourth control input terminal for fast reverse run and responsive to an operation signal selectively applied to one of said control input terminals thereof for controlling a motor adapted to drive a magnetic tape;

cassette loading direction detecting means for detecting the loading direction of a cassette when loaded into the tape recorder; and

switch circuit means responsive to said cassette loading direction detecting means for switching a connection between side A and side B playback mode output terminals of said operation section and said first and second control input terminals of said motor control circuit and a connection between side A and side B fast mode output terminals of said operation section and said third and fourth control input terminals of said motor control circuit such that, in the first state thereof, said side A and side B playback mode output terminals are connected to said first and second control input terminals, respectively, and said side A and side B fast mode output terminals are connected to said third and fourth control input terminals, respectively, and, in the second state thereof, said side A and side B playback mode output terminals are connected to said second and first control input terminals, respectively, and said side A and side B fast mode output terminals are connected to said fourth and third control input terminals, respectively.

4,488,187
SERVO CONTROL APPARATUS

Ben Alaimo, Campbell, Calif., assignor to Syquest Technology, Fremont, Calif.

Filed Jun. 4, 1982, Ser. No. 385,105
Int. Cl.³ G11B 5/55, 5/58, 21/10
U.S. Cl. 360—77 7 Claims

1. A servo control system, comprising:

(a) a data storage medium having a plurality of data storage tracks, each one of said tracks having a centerline, a servo sector and servo data in said servo sector including a plurality of first servo data being stored across said one

track at substantially one side of said centerline and a plurality of second servo data being stored across said one track at substantially the other side of said centerline;

(b) positionable means for reading said plurality of first servo data and said plurality of second servo data and for generating first pulses representing said first servo data, respectively, and for generating second pulses representing said second servo data, respectively;

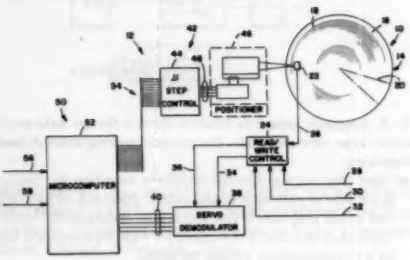
(c) a mechanical means for rotating said data storage medium relative to said positionable means;

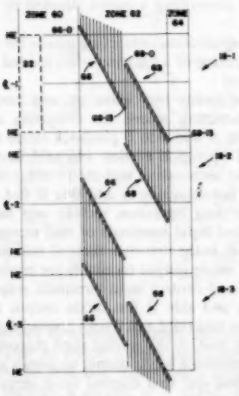
(d) means, responsive to said mechanical means, for generating an index signal indicating a rotation of said data storage medium, said servo sector being aligned to coincide with said index signal during said rotation;

(e) means, responsive to said index signal, for counting in one direction said first pulses and for counting in another direction said second pulses and for storing a count representing the difference between said first pulses and said second pulses;

(f) programmable processing means for generating position control data in response to said count; and

(g) means for positioning said positionable means in response to the position control data.





4,488,188

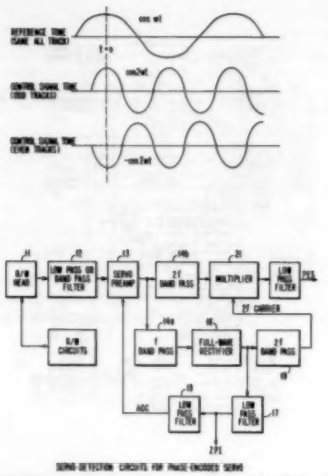
BURIED SERVO RECORDING SYSTEM USING PHASE ENCODED SERVO PATTERN

Neils H. Hansen, and Munro K. Haynes, both of Tucson, Ariz., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 1, 1982, Ser. No. 438,218

Int. Cl.³ G11B *5/58*

U.S. Cl. 360—77 **8 Claims**



1. A track-following buried servo system for positioning a magnetic head over a selected one of a plurality of data tracks on one or more disks in a magnetic recording disk file, comprising

a servo pattern recorded on each of said disks along with said data tracks,

said servo pattern comprising a plurality of servo tracks,

each said servo track having a reference signal recorded therein, said reference signal having the same frequency and phase in each of said servo tracks,

each said servo track also having a control signal recorded therein, said control signals having a higher frequency than said reference signals, the control signals in adjacent ones of said servo tracks being 180° out of phase with each other, the boundary between adjacent servo tracks defining the centerline of one of said data tracks, and

means for detecting the amount of each type of said control signal in the total signal reproduced by said head to produce an indication of the position of said head relative to one of said data track centerlines.

4,488,189

SECTOR SERVO SEEK CONTROL

Frederick E. Axmear; Duane W. Baxter, both of Rochester, Minn.; John H. Saxman, Round Rock, Tex., and Michael M. Siverling, Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

PCT No. PCT/US82/00657, § 371 Date Aug. 16, 1982, § 102(e) Date Aug. 16, 1982, PCT Pub. No. WO83/04133, PCT Pub. Date Nov. 24, 1983

Pub. Date May 17, 1982, Ser. No. 414,285

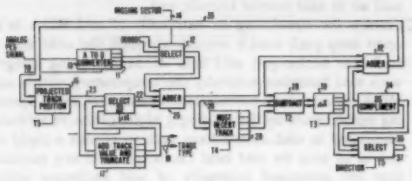
Int. Cl.³ G11B *21/08, 21/10*; G05B *19/25*

U.S. Cl. 360—78 **11 Claims**

1. In a data storage device wherein information is retained on tracks in sectors containing servo data that define sequences of track types that form a capture area and that are accessed by

a transducer assembly driven by an electromagnetic actuator, position control means for moving said transducer assembly from one track location to another track location comprising:

first means to ascertain and record transducer assembly track position at the current sector time;



second means for determining the projected track position of said transducer assembly at the next sector time;

third means for truncating said projected track position; and

fourth means for sensing an error signal and adding said error signal to said truncated projected track position to generate said next sector time actual track position.

4,488,190

MAGNETIC RECORDING DISK CARTRIDGE

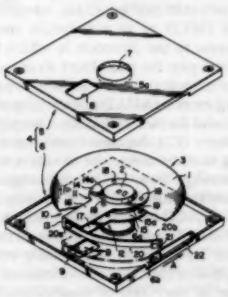
Kengo Oishi, and Osamu Suzuki, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Dec. 6, 1983, Ser. No. 558,428

Claims priority, application Japan, Dec. 9, 1982, 57-186639[U]

Int. Cl.³ G11B *5/012, 5/52, 23/02*

U.S. Cl. 360—97 **3 Claims**



1. A magnetic recording disk cartridge comprising a magnetic recording disk, a casing which accommodates the magnetic recording disk and has at least one magnetic head receiving opening, and a shutter member for closing the magnetic head receiving opening, the shutter member being mounted in the casing for rotation along the inner surface of the casing between an operative position in which it closes the magnetic head receiving opening and an inoperative position in which it opens the same, characterized in that said shutter member is provided with at least one projection on the surface facing the inner surface of the casing and slides on the projection along the inner surface of the casing when it is rotated between the operative position and the inoperative position.

4,488,191

MAGNETIC RECORDING DISK CARTRIDGE

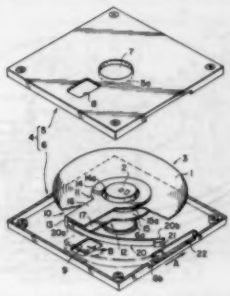
Kengo Oishi, and Osamu Suzuki, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Dec. 6, 1983, Ser. No. 558,429

Claims priority, application Japan, Dec. 9, 1982, 57-216145

Int. Cl.³ G11B *5/012, 5/52, 23/02*

U.S. Cl. 360—97 **2 Claims**



1. A magnetic recording disk cartridge comprising a magnetic recording disk, a casing which accommodates the recording disk for rotation therein and has a pair of magnetic head receiving openings for giving the magnetic head of a recording-reproducing system access to the recording disk, and shutter means which normally closes the magnetic head receiving openings and opens the same when the cartridge is londed in the recording-reproducing system, wherein the improvement comprises a single shutter member which is formed by bending a plate material and includes a pair of arm portions integrally connected with each other by way of a bight portion, the arm portions extending radially inwardly from the bight portion toward the center of the casing on opposite sides of the recording disk and respectively having shutter portions adapted to close the magnetic head receiving openings, at least one arm portion being provided with an annular bearing portion at its free end, the bearing portion being engaged with an engaging portion formed in the inner surface of the casing to support the shutter member for rotation between an operative position in which said shutter portions close the magnetic head receiving openings and an inoperative position in which the shutter portions open the same, one end of a connecting member being operatively connected to the bight portion of the shutter member and the other end of the connecting member being exposed outside the casing, whereby the shutter member is rotated to the inoperative position in response to movement of said the other end of the connecting member.

4,488,192

COOLING ARRANGEMENT FOR HERMETICALLY SEALED DISK FILES

Robert C. Treseder, Aptos, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 28, 1982, Ser. No. 383,043

Int. Cl.³ G11B *23/02*

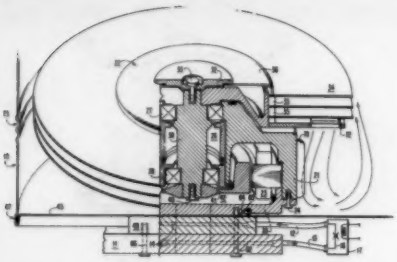
U.S. Cl. 360—98 **1 Claim**

1. A magnetic disk file storage arrangement comprising a plurality of hermetically sealed fluid cooled disk files, each of said files including a disk enclosure and a temperature control module, said enclosure comprising:

a thin walled cylindrical shaped cover section and a substantially flat bottom section and means for sealing said sections together to form a hermetically sealed container for maintaining helium gas within said file at a pressure slightly above atmosphere;

said disk file including a baseplate and means for transferring heat generated within said enclosure to said baseplate;

said temperature control module including a support member, means for attaching said support member in an efficient heat transfer relationship with said baseplate outside of said container including means to seal a section of said baseplate to prevent said gas from escaping from said container, and a closed loop water cooling arrangement for permanently removing heat transferred from said



baseplate to said support member to control the internal temperature of said disk enclosure, and means for mounting said files in close proximity to each other including a frame and means for resiliently attaching said support member of each said file to said frame and connecting said closed loop cooling arrangements for each of said files to a water to water heat exchanger to prevent the heat being removed from one file from adversely affecting the operation of said temperature control module of another file.

4,488,193

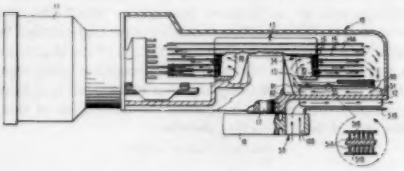
CLOSED LOOP COOLING SYSTEM FOR DISK FILE WITH HEAT EXCHANGER INTEGRAL WITH BASEPLATE

Richard A. Davis, San Jose; Stanton K. Moss, Gilroy, and Sang-Yen Wang, San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 30, 1983, Ser. No. 480,628

Int. Cl.³ G11B *23/04, 25/04*

U.S. Cl. 360—98 **9 Claims**



1. In a disk file having an HDA comprising a baseplate, a plurality of magnetic disks which store information mounted on a spindle bearinged in said baseplate, a plurality of air bearing magnetic transducers, and means for positioning said transducers relative to said disks, an improved system for maintaining the operating temperature within the HDA enclosure substantially constant at a predetermined safe temperature and substantially free of contaminating particles which could adversely affect the normal air bearing relationship between any one of said transducers and an associated disk surface, said system comprising:

(1) means for circulating air internally of said HDA in a substantially closed loop path which extends from the rotational axis of said stack of magnetic disks radially outward across the disk surfaces to the walls of said HDA and includes a return segment from said walls to the axis of said stack, said closed loop path involving first and second parallel branches, said first branch including a filter which creates a relatively high impedance, low volume path for said air in said first branch, said second branch including one side of a heat exchanger which creates a relatively low impedance, high volume path for said air in said second branch; and

(2) means for circulating air externally of said HDA in an open loop path which extends through the cold side of said heat exchanger, said heat exchanger being integral with said baseplate whereby the temperature within said HDA is maintained substantially constant at a safe operating temperature by the relatively high volume of air being circulated in said closed loop path to permit a rapid removal of heat by said heat exchanger and any particles that are generated internally of said enclosure which might adversely affect said normal air bearing relationship are removed from said closed loop path by said filter.

4,488,194

MAGNETORESISTANT TRANSDUCER FOR READING VERY HIGH-DENSITY DATA

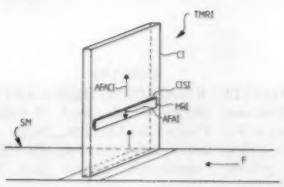
Helle Michel, Marcq, France, assignor to Compagnie Internationale pour l'Informatique Cii-Honeywell Bull, Paris, France

Filed Feb. 23, 1982, Ser. No. 351,342

Claims priority, application France, Mar. 20, 1981, 81 05601

Int. Cl.³ G11B *5/12, 5/30*

U.S. Cl. 360—113 **9 Claims**



5. A magnetoresistant transducer (TMRI) for reading data recorded on a movable medium (SM), comprising at least one magnetoresistor (MRI) of an anisotropic magnetic material disposed transverse to the direction in which the data pass as the medium moves past the transducer so as to be traversed by a current I circulating in the direction of its length, said magnetoresistor having an axis (AFAI) of easy magnetization normal to the medium, and further including a magnetic, anisotropic single domain layer (CI) disposed transversely of and normal to the recording medium and to the direction in which the data pass, said mono-range layer (CI) being magnetically coupled with the magnetoresistor (MRI) and having an axis of easy magnetization (AFACI) normal to the medium and opposite in direction to the axis of easy magnetization of the magnetoresistor, said domain layer being magnetically coupled with the single magnetoresistor (MRI) in such a manner that a complete change of sense of easy axis of magnetization in the single domain layer induces a complete change of sense of the easy axis of magnetization in the magnetoresistor.

4,488,195

MAGNETIC HEAD AND METHOD OF PRODUCING SAME

Yukihiro Yanagiuchi, Katano; Eiichi Hirota; Hiroshi Sakakima, both of Hirakata, and Harufumi Senno, Yamatokoriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Mar. 15, 1982, Ser. No. 358,208

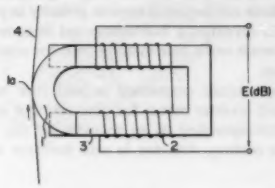
Claims priority, application Japan, Mar. 20, 1981, 56-40977

Int. Cl.³ G11B *5/12, 5/16, 5/251;* H01F *1/04*

U.S. Cl. 360—125 **8 Claims**

1. A magnetic head comprising a head core essentially

formed of metallic magnetic material adapted to be positioned against and brought into contact with a recording medium, said head core being formed with a head gap in a portion thereof positioned against the recording medium and having windings mounted thereon, said metallic magnetic material



being essentially amorphous and having the following composition:

$(Co_{1-x}M'_x)_a\ Zr_b\ Si_c\ B_d$, where M' is at least one element selected from the group consisting of Cr, Mn, Fe, Ni, Nb, Mo, W and Ti, $0.03 \leqq x \leqq 0.15$, $3 \leqq b \leqq 25$, $0 \leqq c \leqq 20$, $0 \leqq d \leqq 5$, and $a+b+c+d=100$.

4,488,196

REMOTE CONTROL DEVICE FOR TAPE RECORDER

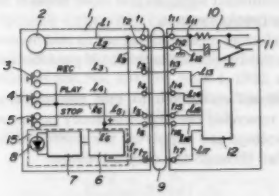
Hideo Takenaga; Hiroki Ichikawa, and Shunichi Orita, all of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Mar. 9, 1982, Ser. No. 356,417

Claims priority, application Japan, Oct. 3, 1981, 56-33340[U]

Int. Cl.³ G11B *15/18, 19/02, 17/00*

U.S. Cl. 360—137 **10 Claims**



1. A remote control device for tape recorder having a tape recorder unit with a main control circuit and an amplifier system energized by the control circuit when the latter is set in a predetermined mode, comprising:

a microphone unit to be connected to an amplifier system in the tape recorder unit, a plurality of operating switches to be connected to the main control circuit provided in the tape recorder unit to set the control circuit in one of a plurality of modes, display means for displaying mode conditions, connecting means for connecting the display means to the microphone so as to be connected to the amplifier system, said display means being arranged to respond to energization of said amplifier system via said connecting means and to display a predetermined mode.

4,488,197

PLATE ROCKING-COUPLING APPARATUS

Sinichi Saitou, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 25, 1982, Ser. No. 381,960

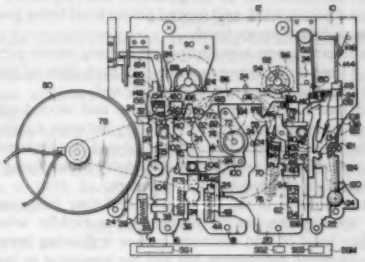
Claims priority, application Japan, May 28, 1981, 56-77873[U]

Int. Cl.³ G11B *0/00*

U.S. Cl. 360—137 **8 Claims**

1. A plate rocking-coupling apparatus comprising:

a first plate member extending in a longitudinal direction and having a peripheral surface, the peripheral surface of the first plate member having formed therein an indentation with an opening, said indentation having a peripheral surface interior of the peripheral surface of said first plate member, the length of said opening along the longitudinal direction of said peripheral surface being shorter than the length of said indentation along said longitudinal direction at a position spaced from said opening toward the interior of said first plate member; and



a second plate member having a peripheral surface and a projecting portion protruding from the peripheral surface of the second plate member, said projecting portion being engaged in said opening so as to be in slide contact with said peripheral surface of said indentation along the circumferential direction of said peripheral surface of said indentation, whereby said first and second plate members are rockable relative to each other due to said slide contact.

4,488,198

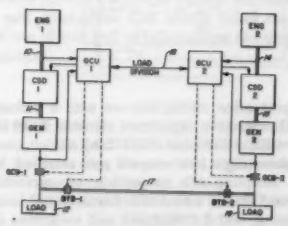
PROTECTIVE CIRCUIT FOR CLUTCHLESS PARALLEL GENERATING SYSTEM

Roland W. Christen, and Alfred A. Deichstetter, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Continuation of Ser. No. 225,315, Jan. 15, 1981, abandoned. This application May 17, 1982, Ser. No. 378,644

Int. Cl.³ H02H *7/06*

U.S. Cl. 361—20 **5 Claims**



1. In a parallel connected, multi-generator electrical distribution system with a generator circuit breaker connecting each generator with a load and with an electrical distribution bus interconnecting the loads through series connected bus tie breakers, one for each generator, in which each generator is driven from a variable speed engine through a constant speed drive having an input connected with said variable speed engine, said constant speed drive having an output with a direct mechanical connection to the generator, the generator operating at a constant speed with variation of the engine speed and in which means are provided controlling each constant speed drive to divide the electrical load between generators, and characterized by the absence of a mechanical overruning clutch between each constant speed drive output and

the associated generator, an improved electrical protective circuit to prevent one generator from driving another as a motor, comprising:

means for sensing a flow of electrical power from the electrical distribution bus to a generator, including:

first means for sensing the flow of electrical power from said distribution bus to the generator and responsive to a first power level;

second means for sensing the flow of electrical power from said distribution bus to the generator and responsive to a second power level, said second power level being greater than said first power level;

means responsive to said first power sensing means providing a time delay between sensing of such flow of power and opening of said bus tie breaker; and

second time delay means responsive to said second power sensing means providing a time delay between sensing of such flow of power and opening of said bus tie breaker, the time delay of said second time delay means being less than that of the first time delay means,

means responsive to the first and second time delay means for opening the bus tie breaker more rapidly when a higher level of said electrical power is flowing between the electrical distribution bus and the generator to isolate both the generator and the load from the electrical distribution bus.

4,488,199

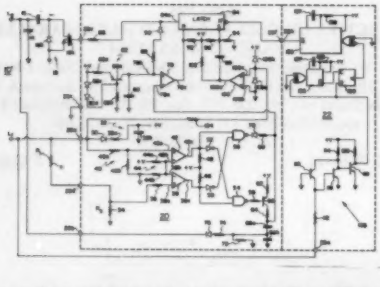
PROTECTION CIRCUIT FOR CAPACITIVE BALLAST

Milton D. Bloomer, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sep. 27, 1982, Ser. No. 424,126

Int. Cl.³ H02H *3/08*

U.S. Cl. 361—93 **14 Claims**



1. A load protection circuit for use with a ballast having, across an A.C. source, a capacitive element in series with a substantially resistive load and a switching device, comprising:

means for detecting a load current zero crossing; and

means for sampling the magnitude of current flowing through said load at a time after the detected load current zero crossing, and for disabling said switching device to prevent substantial load current flow therethrough only if said load current magnitude is of substantially zero magnitude when sampled.

4,488,200

NO-BREAK POWER SUPPLY APPARATUS

Kaoru Matsuzaki, Tokyo, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Sep. 23, 1982, Ser. No. 422,198

Int. Cl.³ H02H *7/122*

U.S. Cl. 361—104 **4 Claims**

1. A no-break power supply apparatus comprising:

a plurality of CVCF's each CVCF having:

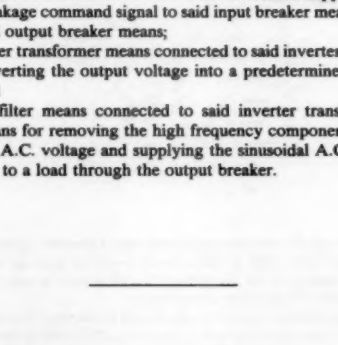
input breaker means connected to a D.C. power supply;

output breaker means connected to a load,

D.C. filter means connected to said input breaker means;

inverter means constructed of gate turn off thyristors connected to said D.C. filter means for converting the direct current from said D.C. power supply into an alternating current, said inverter means having a bridge circuit having an arm including a parallel circuit including a GTO thyristor and a diode connected in reverse polarity in parallel with the GTO thyristor, a fuse connected in series with the parallel circuit and a fuse melting detector connected across the fuse;

protecting circuit means connected to said fuse melting detector in said inverter means for detecting the melting of the fuse corresponding to an accident by the corresponding fuse melting detector in said inventor means,



blocking a gate signal supplied to the gates of all the GTO thyristors normally operated by the output of the detector, then supplying an OFF gate signal to the gates of said all the GTO thyristors except the GTO thyristor connected to the arm of the fuse thus melted and supplying a breakage command signal to said input breaker means and said output breaker means;

inverter transformer means connected to said inverter means for converting the output voltage into a predetermined voltage; and

A.C. filter means connected to said inverter transformer means for removing the high frequency component from the A.C. voltage and supplying the sinusoidal A.C. voltage to a load through the output breaker.

4,488,201

A.C. POWER ENTRY MODULE

Fred C. Webb, Wauconda; Michael B. Head, Arlington Heights, and William P. Cegles, Lake In The Hills, all of Ill., assignors to Corcom, Inc., Libertyville, Ill.

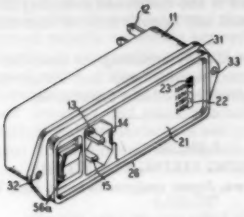
Filed Feb. 15, 1983, Ser. No. 466,627

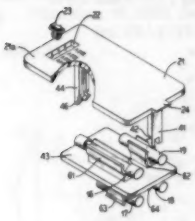
Int. Cl.³ H02B *1/18*

U.S. Cl. 361—334 **7 Claims**

1. An A.C. power module comprising, a housing, input and output power terminals mounted in said housing, electrical contact fuse receiving means mounted in said housing, a fuse carrying means detachably received in said housing and including a plate which can be moved to at least two positions, first fuse holding means mounted on a first planar side of said plate, second fuse holding means mounted on a second side of said plate such that when said plate is in a first position, a fuse or fuses in said first fuse holding means is connected to said fuse receiving means and when said plate is in the second position

a fuse or fuses in said second fuse holding means is connected to said fuse receiving means and circuit means connecting said





fuse receiving means and said input and output power terminals.

4,488,202

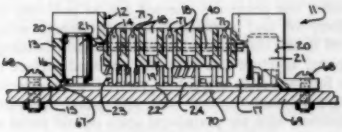
LEAD FRAME CONNECTOR FOR COMPACT CIRCUIT PACKAGE

Lance R. Kaufman, 131 White Oak Way, Mequon, Wis. 53092

Continuation of Ser. No. 353,173, Mar. 1, 1982, abandoned. This application May 11, 1984, Ser. No. 608,930

Int. Cl.³ H05K *7/20*

U.S. Cl. 361—386 **8 Claims**



1. A lead frame connector and a compact circuit package comprising

a first substrate having a first side retaining a first circuit located within a cavity provided by a housing to conduct heat generated by said first circuit through said substrate to a point external to said cavity, at least a portion of said first substrate being located within said cavity and operatively connected to said housing, and

a second substrate retaining a second circuit,

wherein said lead frame connector comprises

a first lead frame extension having a first portion electrically connected to said first circuit and a second portion electrically connected to said second circuit to conduct electrical current between said first and second circuits and engaging said first and second substrates to maintain said first and second substrates in spaced relationship with respect to each other, said first lead frame extension comprising a one-piece section integrally extending from said first substrate to said second substrate to support said second substrate regardless of any supporting engagement of said second substrate by said housing, and

a second lead frame extension spaced from said first lead frame extension and having a first portion connected to one of said first and second substrates and a second portion spaced from the other of said first and second substrates and extending through an aperture within said housing to provide an external electrical connection for said circuit package.

4,488,203

ELECTROCHEMICAL DOUBLE-LAYER CAPACITOR AND FILM ENCLOSURE

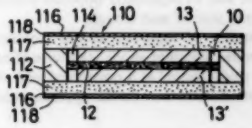
Takayoshi Muranaka, and Hajime Mori, both of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Division of Ser. No. 118,078, Feb. 4, 1980, Pat. No. 4,408,259. This application Mar. 8, 1983, Ser. No. 473,087

Claims priority, application Japan, Feb. 9, 1979, 54-14743; Feb. 9, 1979, 54-14746; Jun. 1, 1979, 54-69324; Jun. 1, 1979, 54-69325

Int. Cl.³ H01G *9/00, 9/04, 9/08*

U.S. Cl. 361—433 **9 Claims**



1. An electrochemical double-layer capacitor which comprises a capacitor element including a pair of polarization electrodes, said electrodes comprising active carbon, and a binder for the active carbon, said pair of electrodes being supported on a sheet-like collector; a spacer separating the pair of polarization electrodes and impregnated with an electrolyte solution; a film enclosure for encasing said capacitor element in a hermetically sealed condition, said film enclosure being formed of two conductive film sheets, said film sheets being composed of a conductive polymer composition and thermally fused to a heat-fusible resin plate, said plate having an opening at the central portion thereof to receive the capacitor element therein, said conductive film sheets being electrically connected to one of said pair of polarization electrodes for electrical connection.

4,488,204

DEVICE FOR USE IN MAKING ENCAPSULATED CHIP CAPACITOR ASSEMBLIES

Raymond L. Beck, Jr., Simpsonville, S.C., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Nov. 1, 1983, Ser. No. 547,643

Int. Cl.³ H01G *9/00*

U.S. Cl. 361—433 **4 Claims**

1. An article adapted to be sliced and machined to provide encapsulated chip capacitors.

(i) comprising an elongated U-shaped metal channel having parallel first and second side members and bottom member, said bottom member having therein a trough parallel to said side members and spaced therefrom,

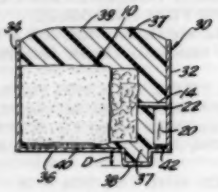
(ii) a plurality of spaced-apart electrolytic tantalum capacitors arranged within said channel, each said capacitor including:

(a) a tantalum body of generally rectangular cross-section having front, rear, bottom, top and side surfaces with portions of said bottom and side surfaces being provided with a cathode metallization and,

(b) an axial tantalum lead wire extending from said front

surface, each said capacitor being positioned within said channel such that (i) the axial tantalum anode lead wire thereof is substantially perpendicular to and extends toward the first side member of said channel with the end of said extended wire being closely adjacent to said first side member, (ii) the rear surface thereof is closely adjacent to the second side member of said channel, (iii) the bottom surface thereof is closely adjacent to the bottom member of said channel,

(iii) a plurality of separate first electrical connections between a portion of the cathode metallization of each said



capacitor and an adjacently opposite portion of said channel on one side of said trough,

(iv) a plurality of separate second electrical connections between the tantalum anode lead wire of each said capacitor and said channel at a portion of said channel adjacent to said anode lead wire on the opposite side of said trough, and

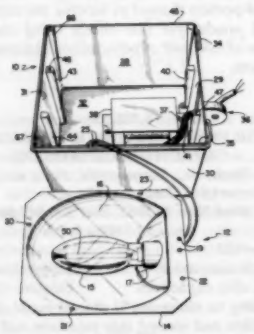
(v) encapsulant insulating material surrounding each capacitor and said plurality of first and second electrical connections and filling the volume defined by said channel including the trough of said channel.

4,488,205

FLOODLIGHT LUMINAIRE WITH ROTATABLE REFLECTOR

Honesto D. Quiogue, Blacksburg, Va., assignor to Harvey Hubbell Incorporated, Orange, Conn.

Filed Nov. 17, 1983, Ser. No. 552,609
Int. Cl.³ F21S *3/00*
U.S. Cl. 362—223 **11 Claims**



1. A luminaire comprising the combination of

a housing having a generally parallelepipedic shape and a square open side;

a mounting device fixedly attached to an exterior surface of said housing;

a reflector having a curved, concave reflective surface and a square periphery dimensioned to be received in said open side in any of its four orientations;

a lamp socket mount attached to said reflector and extending rearwardly thereof:

a lamp having an elongated light source therein;

a lamp socket attached to said mount and extending through said reflector to hold said lamp in front of said concave surface; and

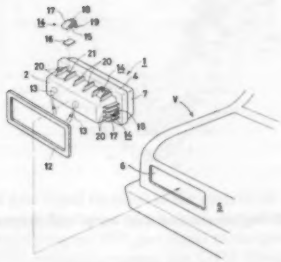
fastener means for removably attaching the assembly comprising said reflector, mount, lamp and socket to said housing in any selected one of said orientations.

4,488,206

LAMP HOUSING FIXING STRUCTURE

Akira Mizusawa, Fujisawa, Japan, assignor to Nifco Inc., Yokohama, Japan

Filed Jul. 1, 1982, Ser. No. 394,186
Claims priority, application Japan, Jul. 1, 1981, 56-96713[U]
Int. Cl.³ B60Q *1/26*; F16B *19/00*
U.S. Cl. 362—226 **9 Claims**



1. A fastening system for mounting a lamp housing within an aperture formed within a body panel, having an interior face and an exterior face, of an automobile within which the housing is adapted to be securely mounted and fastened, comprising:

peripheral flange means formed upon said housing for engaging said exterior face of said panel within which said housing is to be disposed;

pairs of laterally spaced ribs fixedly secured upon said housing about the periphery thereof and at positions axially interiorly of said peripheral housing flainge means as viewed in the direction of insertion of said housing into said panel aperture and including inclined surface means at the forward ends thereof, as viewed in the direction of insertion of said housing into said panel aperture, for engagement with the peripheral walls of said panel which define said panel aperture so as to initially guide said housing toward the center of said panel aperture during axial insertion of said housing into said panel; and

fastening means, separate from said panel and said housing, disposed about said periphery of said housing, and interposed between said pairs of ribs so as to be laterally confined thereby, including first means for fixedly securing said fastening means within said housing, and second means flexibly connected to said first means for engaging said peripheral walls of said panel which define said panel aperture so as to be initially flexibly deflected from an original position by said peripheral walls of said panel as said housing is inserted within said panel, and subsequently expanded back to its original position so as to engage said interior face of said panel thereby lockingly retaining said housing within said panel when said housing is fully inserted within said panel,

the fastening means having an axial length, as viewed in the direction of insertion of said housing into said panel aperture. which is less than that of said pairs of ribs so as to be axially recessed between said pairs of ribs and thereby permit said forward inclined surfaces of said pairs of ribs to perform said initial guiding function of said housing

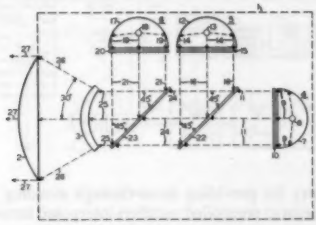
toward said center of said panel aperture, and said second means of said fastening means having a height, when disposed at said undeflected original position, which is greater than the vertical extent of said pairs of ribs so as to extend radially outwardly beyond said pairs of ribs and thereby be engageable with said peripheral walls of said panel which define said panel aperture for secondarily continuing said guiding movement of said housing toward said center of said panel aperture, as initiated by said inclined forward surfaces of said pairs of ribs, during said axial insertion of said housing into said panel aperture.

4,488,207

STATIC MULTI-COLOR LIGHT SIGNAL

Kevin E. Harmon, Brentwood, Pa., assignor to American Standard Inc., Wilmerding, Pa.

Filed Aug. 18, 1983, Ser. No. 524,255
Int. Cl.³ F21V *9/00*
U.S. Cl. 362—231 **14 Claims**



1. A multi-color light signal unit comprising, at least one lamp for producing light rays, at least one parabolic mirror for reflecting the light rays in a substantially parallel orientation to the axial ray, at least one color filter for transmitting specific wavelengths of the light rays and for reflecting or absorbing all other wavelengths of the light, and at least one inclined dichroic filter of selected angle of incidence for receiving the passed wavelengths of the light at substantially the same angle of incidence as the angle of incidence of the dichroic filter and for conveying the passed wavelengths of the light onto a lens system which projects a signal light of homogeneous hue.

4,488,208

LOW BRIGHTNESS LENS FOR CIRCULAR FLUORESCENT LAMPS

Jack V. Miller, Sierra Madre, Calif., assignor to Union-Reed Corporation, Chelsea, Mass.

Filed Aug. 20, 1982, Ser. No. 409,998
Int. Cl.³ F21V *5/02, 5/08*
U.S. Cl. 362—339 **12 Claims**

1. A lighting diffuser for a circular gas discharge lamp comprising,

a light-transmitting panel,

said panel having an overall pattern on one face comprising a Fresnel lens arrangement having an optical center cylindrical ring, said lens focussing light from said lamp into a plurality of parallel rays, which ring intersecting which lamp substantially along its entire length,

said panel having a pattern on its other face comprising a radial pattern of elongated, substantially triangular prisms arranged about an axis along the center of said ring.

4,488,209

PORTABLE LIGHTING APPARATUS

Earl W. Gosswiller, Clarendon Hills, Ill., assignor to Federal Signal Corporation, Oak Brook, Ill.

Filed Aug. 29, 1983, Ser. No. 527,034
Int. Cl.³ B60Q *1/06*
U.S. Cl. 362—386 **10 Claims**

1. Portable lighting apparatus for mounting on a vehicle and providing a light source at a height substantially elevated above the vehicle, said apparatus comprising, in combination, a mast assembly comprising at least one vertical tubular mast section, mast support means for supporting said mast assembly from its lower end, a push rod located within said mast and substantially coextensive in length therewith, push rod support means associated with said mast support means for vertically supporting the lower end of said push rod, an electric lamp assembly mounted on the upper end of said mast, said lamp assembly including at least one lamp mounted on a generally horizontal lamp shaft for rotation therewith, vertical rack means supported on the upper end of said push rod, and pinion gear means mounted on said lamp shaft for conjoint rotation with said lamp assembly about a generally horizontal axis, said lamp assembly and pinion gear being vertically movable with said mast, whereby manual vertical movement of said mast relative to said mast support will effect movement of said pinion gear along said rack thereby rotating said lamp assembly to a desired position.

4,488,210

POWER SUPPLY CIRCUIT OF SWITCHING REGULATOR TYPE

Masahiro Shono, Osaka, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Apr. 7, 1983, Ser. No. 482,979
Claims priority, application Japan, Apr. 7, 1982, 57-58647; Apr. 19, 1982, 57-65590
Int. Cl.³ H02M *3/335*
U.S. Cl. 363—19 **13 Claims**

1. A power supply circuit of switching regulator type comprising:

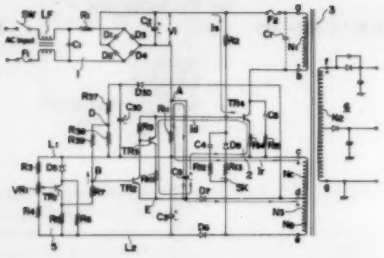
a converter transformer (3) defined by a first winding (N1)

for receiving input power from a DC source (1) and second winding (N2) for producing output power;

a switching transistor means (TR4) connected to said first winding (N1) for alternately making and breaking electric connection between said DC source and said first winding by alternate turn on and off operations of said switching transistor means (TR4);

a rectifier (6) connected to said second winding for rectifying the output power;

first detecting means (C3, D6, N3) for detecting the rectified output DC voltage during off-period of said switching transistor means (TR4) and for producing an output-voltage signal representing said output DC voltage;



second detecting means (C30, D30, R37, R38, R39, N3; C10, D10, R17, R18, R19, N3; C20, D20, R27, R28, R29, N3) for detecting the input DC voltage during on-period of said switching transistor means and for producing an input-voltage signal representing said input DC voltage;

adding means (B) for adding said input-voltage signal and output-voltage signal and for producing a sum signal representing the sum of input- and output-voltage signals;

means (TR2, TR3, R9, R10, R14, C5) for controlling said on and off operations of said switching transistor means based on said sum signal so as to stabilize the rectified output power.

4,488,211

HARMONIC AND PULSATION REDUCING CIRCUIT USED IN A MULTIPLEX POLYPHASE RECTIFIER CIRCUIT

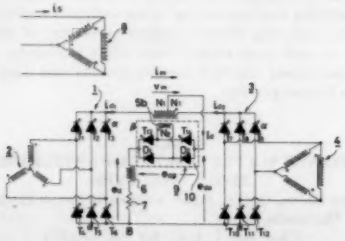
Shota Miyairi, No. 5-3-10, Kamiuma, Setagaya-ku, Tokyo, Japan

Filed Aug. 17, 1982, Ser. No. 408,890

Claims priority, application Japan, Mar. 31, 1982, 57-50939

Int. Cl.³ H02M *7/17, 1/00*

U.S. Cl. 363—45 **3 Claims**



1. In a multiplex polyphase rectifier circuit including an interphase reactor and a plurality of rectifier circuits, a harmonic and pulsation reducing circuit comprising a secondary winding associated with said interphase reactor, and an additional rectifier circuit rectifying the voltage induced in said secondary winding, said harmonic and pulsation reducing circuit being connected between a central point of said interphase reactor and a load in such a relation that said secondary winding is connected in series with said load, whereby the voltage obtained as a result of rectification of said induced voltage is superposed on the DC output voltage of said multiplex polyphase rectifier circuit.

4,488,212

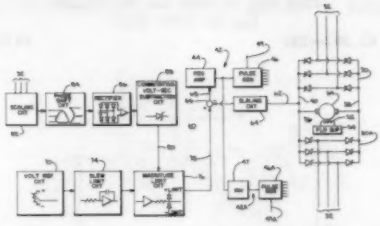
VOLTAGE LIMIT PROTECTION CIRCUIT FOR PHASE CONTROLLED RECTIFIERS

Charles E. Rettig, Brookfield, Wis., assignor to MagneTek Inc., Milwaukee, Wis.

Filed Feb. 28, 1983, Ser. No. 469,561

Int. Cl.³ H02H *7/125*

U.S. Cl. 363—54 **13 Claims**



1. Circuitry for providing shoot-through avoiding voltage limit protection to controlled rectifiers interposed between a.c. voltage power mains and a d.c. load, said rectifiers providing power supplying and regenerating operation to the d.c. load, said rectifiers being commutated among the a.c. voltages of the power mains by a firing circuit, said protection circuitry providing a reference signal for the voltage regulator of the firing circuit and comprising:

reference signal means providing an output signal corresponding to the desired output voltage of the controlled rectifiers;

magnitude limit means coupled to the output of said reference signal means for providing the reference signal for the voltage regulator, said magnitude limit means receiving a limiting signal for limiting the reference signal to a magnitude not greater than that established by the limiting signal;

circuit means providing a d.c. voltage representative of the a.c. voltage existing in the a.c. power mains; and

commutating volt-seconds subtraction means coupled to said circuit means for reducing the d.c. voltage by a predetermined amount sufficient to avoid shoot-through in the rectifiers, said commutating volt-seconds subtraction circuit providing the reduced signal to said magnitude limit circuit as the limiting signal.

4,488,213

ENERGY CONVERTER

Wolter Buikema, Hengelo, Netherlands, assignor to Hollandse Signaalapparaten B.V., Hengelo, Netherlands

Filed Jul. 14, 1982, Ser. No. 398,174

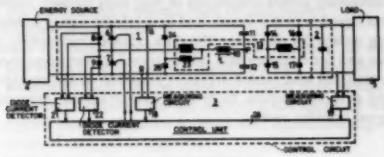
Claims priority, application Netherlands, Jul. 23, 1981, 8103474

Int. Cl.³ H02M *3/315;* H02H *7/122*

U.S. Cl. 363—58 **15 Claims**

1. An energy converter for supplying a load with energy from a voltage source comprising, a series-resonant bridge circuit coupled to the voltage source and including at least two thyristors each having a respective diode connected antiparallel thereto and a high-frequency output transformer coupled to the load and to an energy buffer, a control circuit for generating trigger pulses for the thyristors in response to energy sup-

plied to and extracted from the buffer to bring the appropriate thyristors into the conducting state, means for ensuring that the diode, anti-parallel connected to the last-conducting thyristor, starts to draw current immediately after said thyristor is blocked, the control circuit including diode current detectors



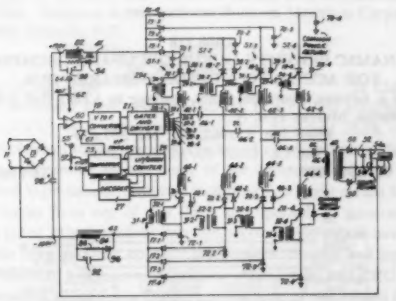
for supplying signals indicative of the presence of a current flowing through said diodes, and switching means for passing the trigger pulses to the thyristors in the bridge circuit conditional upon the presence of a current flowing through the respective diodes antiparallel connected to the thyristors last conducting.

4,488,214

HIGH-POWER, HIGH-FREQUENCY INVERTER SYSTEM WITH COMBINED DIGITAL AND ANALOG CONTROL

Derek Chambers, Bayville, N.Y., assignor to Spellman High Voltage Electronics Corp., Plainview, N.Y.

Filed Nov. 15, 1982, Ser. No. 441,660
Int. Cl.³ H02P *13/22*
U.S. Cl. 363—71 **22 Claims**



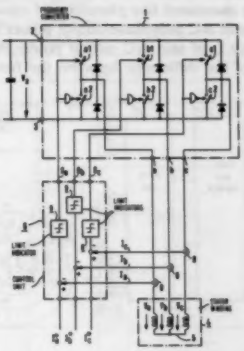
1. An inverter system having a DC input power source; a plurality of resonating current supplying stages connected in parallel to supply current to a load, all of said stages being resonant at the same frequency; first means responsive to the total load output varying from a predetermined value for adjusting the rate at which said stages operate in an attempt to maintain the total load output; at said predetermined value; and second means for determining when the rate of operation of said stages increases beyond a maximum limit or decreases below a minimum limit and in response thereto for enabling operations of a selected group of said stages in an attempt to maintain the rate of operation of said stages within such limits.

4,488,215

METHOD AND APPARATUS FOR CONTROLLING THE LOAD CURRENT OF A PULSED FREQUENCY CONVERTER

Gerhard Pfaff, Erlangen, and Albert Wick, Hagenau, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jul. 19, 1982, Ser. No. 399,250
Claims priority, application Fed. Rep. of Germany, Aug. 7, 1981, 3131361
Int. Cl.³ H02M *5/25*
U.S. Cl. 363—159 **13 Claims**



1. A method for forming addressing signals for addressing respective converter switches of a frequency converter wherein a DC voltage is provided across DC input terminals of the frequency converter for producing a current and a voltage at a load which is connected to phase outputs of the frequency converter, the method having the steps of determining space vectors for the load current and load voltage, determining a plurality of discrete space vectors which are determined by the states of the converter switches, representing the load voltage vector as a time average of selected ones of the discrete space vectors which are each addressable by respective addressing signals, preselecting desired load current values, determining control differences between actual load current values and the preselected desired load current values, and switching among the discrete space vectors in response to the determined control differences, the method comprising the further steps of:

generating a trigger pulse; and

determining the addressing signals which correspond to a voltage vector which is to be addressed until a subsequent trigger pulse is generated such that the load voltage vector to be addressed is arranged in opposition to a control difference vector which is determined in response to the control differences, said control difference vector corresponding to a vectorial difference between the load current space vector and a desired current vector which corresponds to the preselected desired load current values.

4,488,216

UNRESTRICTED FREQUENCY CHANGER SYSTEM AND ADJUSTABLE FREQUENCY AC MOTOR DRIVE USING SUCH A SYSTEM

Laszlo Gyugyi, Penn Hills, and Miklos Sarkozi, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

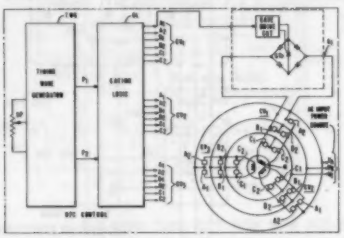
Filed Apr. 29, 1983, Ser. No. 490,079
Int. Cl.³ H02M *5/257*
U.S. Cl. 363—160 **4 Claims**

1. In a frequency conversion apparatus having a plurality of phase-related static converters each coupled between a poly-

phase AC power source of frequency f_{IN} and a polyphase AC output power supply of frequency f_o; including:

for each of said converters a plurality of controllable bilateral switching units controlled for conduction in succession during a time period (TP) characterizing said frequency f_o, each switching unit having a controllable conduction time interval (t) within a common time frame T defined by a controllable repetition rate, and occurring through said succession at said repetition rate to derive energy from said AC power source through the associated converter during successive segments of voltage, on a phase basis, and to apply the derived voltage segments of said succession to said AC output power supply so as to form with associated like pluralities of converter switching units said AC polyphase output power supply;

the frequency f_o of said AC output power supply being a function of the difference between the frequency f_{IN} of



said AC power source and said repetition rate; the combination of:

means synchronized with said repetition rate and operative on said controllable conduction time interval (t) for establishing with said succession of switching units n elementary conduction time intervals (t*) distributed throughout the time frame (T) of operation of each switching unit in said succession and occurring at a rate which is n times said repetition rate, the sum of said elementary conduction time intervals (t*) within such time frame (T) being equal to said controllable conduction time interval (t) n being an integer in relation to the output frequency of said AC power supply; and

means for controlling the switching units of said succession each one n times before controlling another; thereby to improve the quality of the current in the output AC power supply and in the input AC power source.

4,488,217

DATA PROCESSING SYSTEM WITH LOCK-UNLOCK INSTRUCTION FACILITY

Paul Binder, Tyngsboro, and David A. Cane, Sudbury, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 019,350, Mar. 12, 1979, abandoned. This application May 19, 1981, Ser. No. 265,173

Int. Cl.³ G06F *13/00*

U.S. Cl. 364—200 **4 Claims**

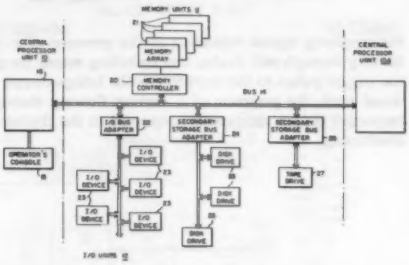
1. A data processing system including a memory, a first and second data means, and a common bus interconnecting said memory and said first and second data means for transferring data and data transfer instruction signals which enable the transfer of data between said memory and said first and second data means over said common bus, said data transfer instruction signals including signals representing a first instruction and signals representing a second instruction,

each of said first and second data means including:

(i) data transfer instruction signal transmitting means connected to said data transfer instruction signal transfer means for transmitting data transfer instruction signals including signals representing the first instruction and signals representing the second instruction;

(ii) inhibit signal transmitting means for transmitting an inhibit signal to said data transfer instruction signal transmitting means to inhibit it from transmitting a first instruction;

(iii) decoding means connected to said data transfer instruction signal transfer means and said inhibit signal transmitting means for decoding the data transfer instruction signals and for enabling said inhibit signal transmitting means to transmit said inhibit signal in response to the receipt of said first instruction from said data transfer instruction signal transfer means;



(iv) first disabling means connected to its respective data transfer instruction signal transmitting means and said decoding means for disabling the respective decoding means when the connected data transfer instruction signal transmitting means transmits the first instruction; and

(v) second disabling means connected to its respective inhibiting signal transmitting means and said data transfer instruction signal transfer means and responsive to the receipt of signals representing the second instruction from said data transfer instruction signal transfer means for disabling said inhibiting signal transmitting means to thereafter enable its respective data transfer instruction signal transmitting means to transmit signals representing the first instruction.

4,488,218

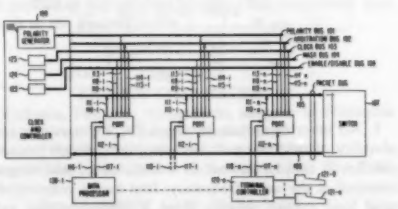
DYNAMIC PRIORITY QUEUE OCCUPANCY SCHEME FOR ACCESS TO A DEMAND-SHARED BUS

Gary J. Grimes, Thornton, Colo., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jan. 7, 1982, Ser. No. 337,674

Int. Cl.³ G06F *15/16, 9/46, 3/04*

U.S. Cl. 364—200 **18 Claims**



1. In a system for allocating access to a demand-shared facility among a plurality of units wherein each unit has an assigned unique n digit priority number for determining facility access during concurrent requests by said units, said system comprising;

an arbitration bus interconnecting all of said units,

means in each of said units for requesting access to said demand-shared facility,

a plurality of multistate logic devices in each of said units,

control means for selectively and combinationally switching said logic devices from a first to a second state in each of said units under control of specified parameters representing the current dynamic state of said units,

a register in each unit

means for forming a dynamic priority number for each of said units by applying the outputs of said logic devices as parameter digits to the more significant digit positions of said unit's register and by applying the digits of said assigned priority number to the lesser significant digit positions of said unit's register,

a mask bus interconnecting said units,

means for applying a mask signal at selected times to said mask bus,

means in each of said units currently requesting access to said demand-shared facility for concurrently superimposing the corresponding digits of the associated dynamic priority number onto said arbitration bus sequentially digit by digit,

means in each requesting unit responsive so long as said mask signal is extant on said mask bus for disabling said superimposing means so that no parameter digits of a requesting unit are superimposed on said arbitration bus,

means for comparing the digit values on said arbitration bus with the corresponding digit values applied by each of said requesting units, and

means for removing from facility access contention a requesting one of said units upon the detection of a prescribed comparison result between a bus digit value and the corresponding digit value applied by said unit,

said disabling means also being effective so that said preference for facility access between said requesting units is determined by any parameter bits applied to said bus and by the applied bits of said assigned priority numbers of said requesting units.

4,488,219

EXTENDED CONTROL WORD DECODING

Charles A. Lemaire, and David A. Luick, both of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

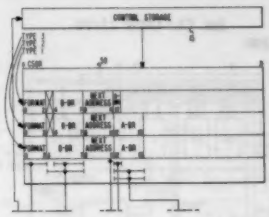
Filed Mar. 18, 1982, Ser. No. 359,323

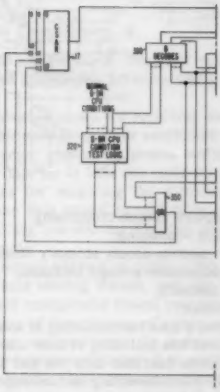
Int. Cl.[3] **G06F** *9/30*

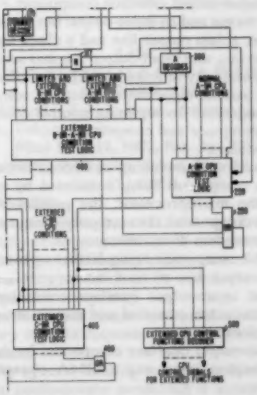
U.S. Cl. 364—200 **15 Claims**

1. Extended logic decode circuitry in a central processing unit (CPU) of a computer system for decoding fields of a control word to increase the number of combinations of functions represented by the fields of the control word, said extended logic decode circuitry including first logic means having inputs from one of said fields and operable to generate a first set of 2^n independent decodes, second logic means having inputs from said first set of 2^n independent decodes and inputs representing a first set of conditions provided by said CPU for generating a signal as a function of the state of one of said first set of conditions and one of said first set of independent decodes, third logic means having inputs from another of said fields and operable to generate a second set of 2^m independent decodes where said second set of independent decodes is separated into 2^m-x and x decodes, fourth logic means having inputs from 2^m-x decodes of said second set of 2^m independent decodes and inputs representing a second set of conditions provided by said CPU for generating a signal as a function of the state of one of said second set of conditions and one of said second set of independent decodes, the improvement comprising:

fifth logic means having inputs consisting of said first set of independent decodes from said first logic means, an input from one of said x decodes of said second set of independent decodes and inputs representing a third set of conditions provided by said CPU and operable to generate signals as a function of the state of at least one of the third







set of conditions, one of said first set of decodes and said one of said x decodes, and,

means connecting said one of said x decodes to inhibit said second logic means when said one of said x decodes is in a predetermined state.

4,488,220

CIRCUIT ARRANGEMENT FOR INPUTTING CONTROL SIGNALS INTO A MICROCOMPUTER SYSTEM

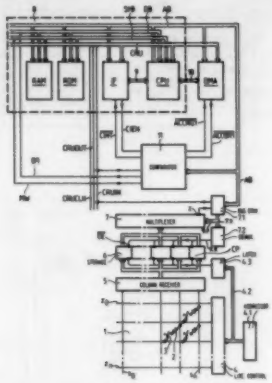
Paul Friedli, Zürich, and Fritz Meyer, Küssnacht, both of Switzerland, assignors to Inventio AG, Hergiswil, Switzerland

Filed Mar. 19, 1982, Ser. No. 359,829

Claims priority, application Switzerland, Mar. 26, 1981, 2037/81

Int. Cl.³ G06F *15/16*

U.S. Cl. 364—200 3 Claims



1. A microcomputer system comprising:

a microcomputer containing:

at least one random-access memory storing data bits in related, addressable storage locations;

a read-only memory;

a microprocessor;

an address bus, a data bus including at least one data line, and a control bus including at least one control line;

each said address bus, said data bus and said control bus operatively interconnecting said microprocessor, said at least one random-access memory and said read-only memory;

a parallel input-output interface component;

conductor means and an input-output bus including a data input line, a data output line and a clock signal line;

said address bus, said input-output bus and said conductor means operatively interconnecting said microprocessor and said parallel input-output interface component;

a circuit arrangement for inputting control commands into said microcomputer and comprising:

conductor means;

a DMA component including an address register;

said DMA component being connected by said address bus to the microprocessor, the parallel input-output interface component, the read-only memory, and the at least one random-access memory:

said DMA component being further connected by said input-output bus to said microprocessor and said parallel input-output interface component, and by said conductor means of said circuit arrangement to said microprocessor;

said input-output interface component having an interrupt request input and a DMA operation release output;

said DMA component having a DMA request input and a DMA receipt output;

a comparator connected to said input-output interface component via said interrupt request input and said DMA operation release output thereof and to said DMA component via said DMA request input and said DMA receipt output thereof;

said microcomputer generating a DMA operation release signal which is transmitted to said comparator via said DMA operation release output of said input-output interface component and by said comparator to said DMA request input of said DMA component in order to initiate a DMA operation;

a peripheral unit connected to said data input line of said input-output bus;

said peripheral unit comprising a group of control command transmitters and a group of addressable storage cells;

each one of said control command transmitters being operatively associated with a related one of said addressable storage cells;

each said control command transmitter generating an initial control command which is stored in a related one of the addressable storage locations of said random-access memory of the microcomputer and in said related addressable storage cell as an initial data bit;

each said control command transmitter, in response to an externally applied command signal, generating an instantaneous control command which is transmitted to said related addressable storage cell, replaces said initial data bit stored therein and, in turn, is stored therein as an instantaneous data bit;

said comparator having a first input connected to the data input line of said input-output bus and having a second input;

said comparator containing a read-write memory connected to said address bus and to said at least one control line of said control bus;

said read-write memory contained in said comparator comprising a predetermined number of addressable storage locations;

said read-write memory having a data input connected to said at least one data line of said data bus in order to store said initial data bit in a related one of said addressable storage locations;

said read-write memory further having a data output connected to said second input of said comparator;

said address register of said DMA component sequentially placing on said address bus a plurality of addresses, each of which addresses serves to address the related one of said addressable storage cells, the related one of said addressable storage locations in said read-write memory contained in said comparator and the related one of said addressable storage locations in said at least one random-access memory of said microcomputer;

said comparator, during said DMA operation, receiving at said first input thereof via said data input line of said input-output bus the instantaneous data bit stored in the addressed storage cell and receiving at said second input thereof from said data output of said read-write memory said initial data bit stored at the addressed storage location thereof and comparing said instantaneous data bit and said initial data bit;

said comparator, in the case of equality of the instantaneous data bit and the initial data bit, continuing to transmit said DMA operation release signal to said DMA request input of said DMA component and to compare the instantaneous data bit and the initial data bit associated with a further address of said plurality of addresses by which there is addressed a further one of the related addressable storage cells, a further one of the related storge locations in said read-write memory and a further one of the related storage locations in said at least one random-access memory; and

said comparator, in the case of inequality of the instantaneous data bit and the initial data bit, generating and transmitting an interrupt request signal to said microprocessor via said interrupt request input of said input-output interface component and blocking said sequentially placing of a further address on said ad-

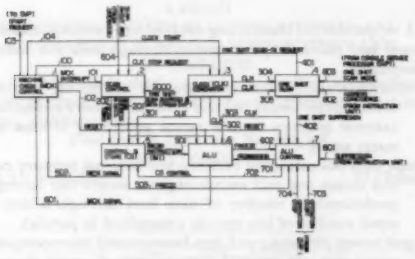
dress bus, whereby said microprocessor, during an interrupt operation thereof, reads said instantaneous data bit, which is associated with the addressed storage cell and which is present on said data input line of said input-output bus, and writes said instantaneous data bit into the addressed storage location of said random-access memory of said microcomputer and into the addressed storage location of said read-write memory contained in said comparator via the at least one data line of said data bus, and the microprocessor, after completion of the interrupt operation, terminates said DMA operation release signal and thereby said DMA operation.

4,488,221

DATA PROCESSING SYSTEM

Kenichi Wada, Zama, and Takashige Kubo, Hachioji, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 24, 1982, Ser. No. 361,265
Claims priority, application Japan, Mar. 25, 1981, 56-42313
Int. Cl.³ G06F *11/00*
U.S. Cl. 364—200 **10 Claims**



1. A data processing system having a function of scanning-in pseudo-failure data so as to investigate the operating condition of the system comprising:

operation executing means for executing operations while receiving a permission signal, including a plurality of flip-flops and means for producing a freeze signal when failure occurs in said operation executing means as indicated by a condition of at least one of said flip-flops;

scan control means for scanning-in said pseudo-failure data into said flip-flops in said operation executing means to produce a pseudo-failure condition therein and cause generation of said freeze signal;

operation control means for supplying said permission signal to said operation executing means and including means responding to said freeze signal for inhibiting application of said permission signal to said operation executing means so that said operation executing means is caused to pause in its operation; and

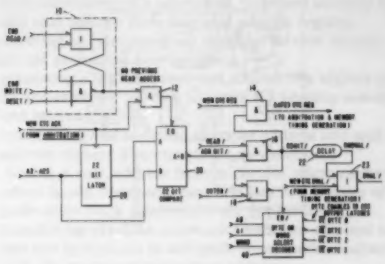
signal providing means responding to a signal ordering generation of said pseudo-failure condition for providing a one-shot scan-in request signal to said scan control means to start a scan-in operation of said pseudo-failure data and providing a one-shot suppression signal to cause operation of said inhibiting means in said operation control means, said one-shot suppression signal having a pulse width covering a time span extending until after a time point at which said operation executing means produces said freeze signal in response to said scan-in operation.

4,488,222

CIRCUIT FOR REUSING PREVIOUSLY FETCHED DATA

Arthur F. Cochcroft, Jr., Lexington, and James M. Lockwood, West Columbia, both of S.C., assignors to NCR Corporation, Dayton, Ohio

Filed May 10, 1982, Ser. No. 376,893
Int. Cl.³ G06F *1/00*
U.S. Cl. 364—200 **9 Claims**



1. A prefetch circuit for a computer system of the type incorporating an addressable memory and a system bus comprising:

an error correcting means for receiving memory addressed data and for providing error correction where appropriate, said error correcting means storing said memory addressed data for at least one memory cycle;

storing means for receiving the memory address which accessed the data stored in said error correcting means and for storing the address received during the previous memory cycle;

comparator means adapted to receive the memory address stored in said storing means, and the present memory address, said comparator means providing an output signal indicative of the presence of a match in addresses; and

decoder means responsive to the output signal from said comparator means and coupled to said error correcting means for enabling said error correcting means for placing said memory addressed data stored therein onto the system bus as the data addressed by the present memory address.

4,488,223

CONTROL APPARATUS FOR A PLURALITY OF MEMORY UNITS

Yoshinori Chiwaki, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed May 11, 1982, Ser. No. 377,000
Claims priority, application Japan, May 14, 1981, 56-71471
Int. Cl.³ G06F *11/00*
U.S. Cl. 364—200 **6 Claims**

1. In a data processing system of the type having a processor and a plurality of memory units, each said memory unit providing a status signal indicating either an error condition or a normal operating condition of its respective memory unit, a control apparatus comprising:

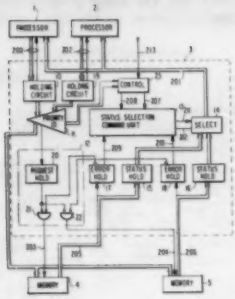
memory unit access means for simultaneously accessing said memory units in response to an access request from said processor;

a plurality of error holding circuits, each said error holding circuit continuously producing a status error signal in response to an error indication made by the status signal from a corresponding memory unit;

control means for generating a write command signal in response to a request from said processor;

status selection commanding means responsive to said write command signal from said control means, a status error signal from one of said error holding circuits, and an externally received master designating signal designating

one of said memory units as a master memory unit, for producing a status selection signal simultaneously with the generation of said status error signal during a write mode operation, while producing a status selection signal in response to the next clock pulse after the generation of said status error signal during a read mode operation; and



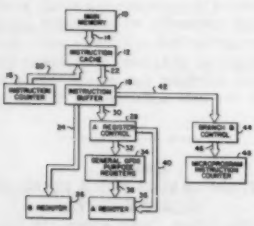
status selector means for returning one of the status signals given from said memory units to said processor as a status notifying signal in response to the output of said status selection commanding means.

4,488,224

SYSTEM FOR CONTROLLING DATA FLOW

Stephen J. Ippolito, Concord; Arthur L. Singer, Lexington, and William J. Lambert, Westford, all of Mass., assignors to IPL Systems, Inc., Waltham, Mass.

Filed Aug. 10, 1982, Ser. No. 406,775
Int. Cl.³ G06F 7/00, 9/22
U.S. Cl. 364—200 **11 Claims**



1. A system for generating a specification error signal in response to a predetermined type of instruction in at least one preselected format containing: (i) an operation code of at least two binary bits of information, the binary state of at least one bit indicating said instruction is of said predetermined type, and (ii) at least one field of at least two binary bits of information the binary states of said two bits determining whether a specification exception exists in said instruction, said system comprising, in combination:

discriminator means for generating a first enabling signal in response to said instruction when said instruction is in said preselected format, said discriminator means comprising: (1) means for detecting and discriminating between instructions in said preselected format and instructions in other formats, and (2) means for generating said first enabling signal when said instructions are in said preselected format;

means for generating a second enabling signal in response to the binary state of said one bit of said operation code indicating said instruction is of said predetermined type; and

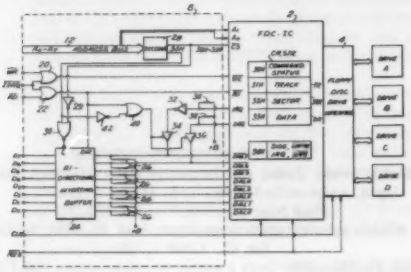
means for generating said specification exception signal in response to (a) said first enabling signal, (b) said second enabling signal, and (c) a predetermined binary state of each of said bits of said field of said instruction.

4,488,225

DATA TRANSFER APPARATUS FOR A MICROCOMPUTER SYSTEM

Shunsuke Furukawa, Tokyo, and Kenji Yamamoto, Kashiwa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 24, 1982, Ser. No. 410,911
Claims priority, application Japan, Aug. 24, 1981, 56-132487
Int. Cl.³ G06F 13/00
U.S. Cl. 364—200 **11 Claims**



1. Apparatus for transferring data between external memory means and microcomputer means through data bus means, comprising:

external memory control means for interfacing said microcomputer means and said external memory means, said external memory control means generating at least one status signal;

said data bus extending between said external memory control means and said microcomputer means and having a predetermined number of data lines through which an equal number of bits may be transmitted in parallel;

gate means for gating said data between said microcomputer means and said external memory control means through said data lines of said data bus means and for gating the at least one status signal to said microcomputer means through the same data lines, said microcomputer means generating at least one command signal in response to the at least one status signal; and

gate control means responsive to said at least one command signal for enabling said gate means alternatively to gate said at least one status signal through said data lines to said microcomputer means and to gate said data between said microcomputer means and said external memory control means through said same data lines.

4,488,226

METHOD AND APPARATUS FOR HIGH SPEED ASYNCHRONOUS SERIAL DATA TRANSFER

Martin D. Wagner, Jr., Richardson, and Phillip A. Mathews, Carrollton, both of Tex., assignors to Challenge Systems, Inc., Richardson, Tex.

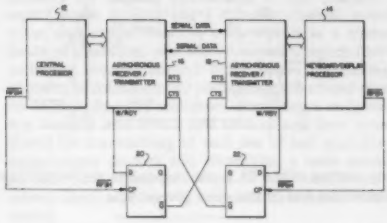
Filed Nov. 23, 1982, Ser. No. 443,945
Int. Cl.³ G06F 15/16
U.S. Cl. 364—200 **7 Claims**

1. An apparatus for high speed serial data communication between a first and second mircroprocessor comprising:

a first asynchronous receiver/transmitter coupled to said first microprocessor having at least one output for synchronizing the operation of a microprocessor and at least one input for enabling serial transmission of data by said receiver/transmitter;

a second asynchronous receiver/transmitter coupled to said second microprocessor having at least one output for synchronizing the operation of a microprocessor and at least one input for enabling serial transmission of data by said second receiver/transmitter;

first digital filter means coupling said at least one output of



said first asynchronous receiver/transmitter to said at least one input of said second asynchronous receiver/transmitter; and

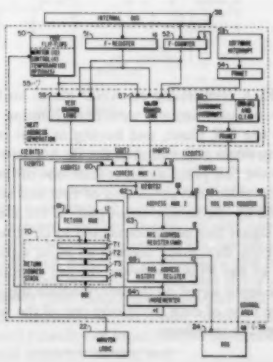
second digital filter means for coupling said at least one output of said second asynchronous receiver/transmitter to said at least one input of said first asynchronous receiver/transmitter.

4,488,227

PROGRAM COUNTER STACKING METHOD AND APPARATUS FOR NESTED SUBROUTINES AND INTERRUPTS

Ming T. Miu, Chelmsford, and John J. Bradley, Framingham, both of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed Dec. 3, 1982, Ser. No. 446,748
Int. Cl.³ G06F 9/42
U.S. Cl. 364—200 **27 Claims**



1. A method of effecting transfers to and from subroutines and interrupt service routines comprising the steps of:

A. generating a first microinstruction of a routine from a memory which identifies a branch to subroutine;

B. executing a branch to a subroutine; said branch executing step including:

a. inhibiting the occurrence of inhibitable interrupts,

b. transferring a current address of said first microinstruction in a current address register to an incrementer,

c. incrementing said current address to produce an incremented address,

d. storing said incremented address, which is a return address, in a first register of a push-down stack,

e. transferring previous return addresses into adjacent registers one level down in said push-down stack simultaneous with the storing of said incremented address,

f. transferring a next address in said first microinstruction into a next address register if no interrupt is pending or if all pending interrupts are inhibited,

g. transferring said next address in said next address register into said current address register, and

h. generating a second microinstruction, which is a first microinstruction of a subroutine, from said memory using said next address from said next address register,

C. generating an interrupt to an interrupt service routine, said interrupt generating step including:

a. generating a vectored interrupt address of a highest priority non-inhibited pending interrupt if a pending non-inhibited interrupt exists,

b. transferring said vectored interrupt address into said next address register if interrupts are not inhibited,

c. storing a next address from a current microinstruction, which is said return addresss, into said first register of said push-down stack if interrupts are not inhibited,

d. transferring previous return addresses into adjacent registers one level down in said push-down stack simultaneous with the storing of said return address,

e. transferring said vectored interrupt address in said next address register into said current address register, and

f. generating a third microinstruction, which is a first microinstruction of a first interrupt service routine, from said memory using said vectored interrupt address from said next address register,

D. generating a microinstruction from said memory which identifies a return from said subroutines or said interrupts; and

E. executing a return from said subroutines or interrupts, said return executing step including:

a. transferring said return address from said first register in said push-down stack to said next address register if no interrupts are pending or if all pending interrupts are inhibited,

b. transferring previous return addresses into said adjacent registers one level up in said push-down stack simultaneous with said transferring said return address to said next address register,

c. generating said vectored interrupt address of said highest priority non-inhibited pending interrupt if a pending non-inhibited interrupt if a pending non-inhibited interrupt exists,

d. transferring said vectored interrupt address into said next address register if interrupts are not inhibited, and

e. generating a fourth microinstruction, which is a subsequent microinstruction to the microinstruction which branches to a subroutine, if no non-inhibited interrupts are pending, or a first microinstruction of a subsequent interrupt service routine if said pending non-inhibited interrupt exists, from said memory using an address from said next address register.

4,488,228

VIRTUAL MEMORY DATA PROCESSOR

Lester M. Crudele, Groton, Mass.; John E. Zolnowsky, Menlo Park, Calif.; William C. Moyer, and Douglas B. MacGregor, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 3, 1982, Ser. No. 446,801
Int. Cl.³ G06F 9/00
U.S. Cl. 364—200 **6 Claims**

1. In a data processor comprising:

external access means for providing access to a resource external to said data processor; and

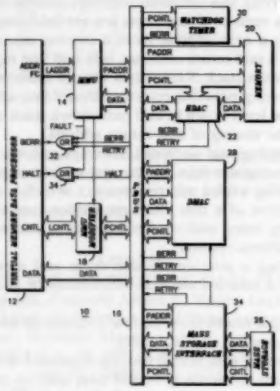
instruction execution control means coupled to said external access means, for controlling the execution by said data processor of at least one instruction which requires access to said resource via said external access means;

an access fault recovery circuit comprising:

fault detection means coupled to said external access means, for detecting a fault in the access to said resource during the execution of said one instruction;

state storing means coupled to said instruction execution control means and to said fault detection means, for storing information indicative of the state of said instruction execution control means as of the time said fault detection means detected said access fault;

exception handling means coupled to said instruction execution control means and to said state storing means, for enabling said instruction execution control means to control the execution by said data processor of a selected sequence of instructions to correct the detected access



fault after said state storing means has stored said state information;

state restoring means for retrieving said stored state information, and restoring the state of said instruction execution control means using said retrieved state information after said instruction execution control means has controlled the execution by said data processor of said selected sequence of instructions to correct the detected access fault; and

instruction continuation means coupled to said instruction execution control means and to said state restoring means, for enabling said instruction execution control means to resume execution of said one instruction from the restored state thereof.

4,488,229

PLA-BASED FINITE STATE MACHINE WITH TWO-LEVEL CONTROL TIMING AND SAME-CYCLE DECISION-MAKING CAPABILITY

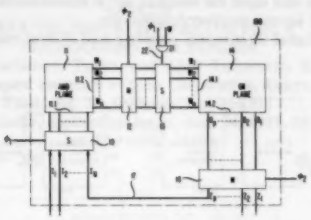
Marc L. Harrison, Morganville, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 8, 1982, Ser. No. 448,001

Int. Cl.³ G06F 9/22

U.S. Cl. 364—200 **19 Claims**

1. A PLA comprising an AND plane, an OR plane, intermediate wordlines connected therebetween, a master register and its slave register connected on each of the wordlines for two-level timing of the PLA, and a combinational logic device connected directly to the slave register in order to control a wordline flow of data from the master register through the slave register to the OR plane in accordance with a WAIT signal applied to the combinational logic device, whereby when the WAIT signal is applied to the combinational logic device at the beginning of a given clock cycle of the two-level



timing, output of the PLA can respond to the WAIT signal at or before the end of the same given cycle.

4,488,230

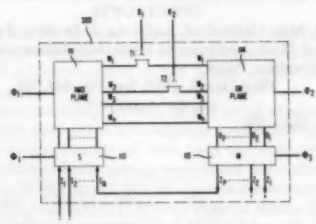
PROGRAMMED LOGIC ARRAY WITH EXTERNAL SIGNALS INTRODUCED BETWEEN ITS AND PLANE AND ITS OR PLANE

Marc L. Harrison, Morganville, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 448,001, Dec. 8, 1982,. This application Jun. 20, 1983, Ser. No. 505,994

Int. Cl.³ G06F 9/22

U.S. Cl. 364—200 **3 Claims**



1. A PLA comprising an AND plane, an OR plane, and a plurality of intermediate wordlines running from the AND plane to the OR plane, and having at least one transistor for modifying during operation of the PLA a flow of data from the AND to the OR plane along at least one of the wordlines, said one of the wordlines consisting of first and second lines interconnected by the source-drain path of the transistor, an intermediate signal line being connected to an input terminal of the transistor for delivering thereto an input signal from a source external to the PLA, whereby during operation of the PLA when the input signal on the intermediate signal line is a WAIT signal the flow of data along said one of the wordlines is interrupted by the transistor.

4,488,231

COMMUNICATION MULTIPLEXER HAVING DUAL MICROPROCESSORS

Kin C. Yu, Burlington, and Gary J. Goss, Acton, both of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Continuation of Ser. No. 192,126, Sep. 29, 1980, abandoned. This application Jul. 11, 1983, Ser. No. 512,701

Int. Cl.³ G06F 13/00

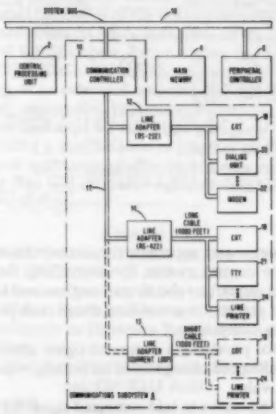
U.S. Cl. 364—200 **10 Claims**

1. A data processing system includes a central processing unit, a main memory and a communication controller, all coupled in common to a system bus for transferring data bytes between said main memory and a plurality of input/output

devices coupled to said communication controller, said communication controller comprising:

shared memory means including mailbox means for storing each of said data bytes received from one of said plurality of input/output devices for transfer to said main memory and storing a receive channel number when said communication controller is in a receive mode of operation, and for storing each of said data bytes received from said main memory for transfer to said one of said plurality of input/output devices and a transmit channel number when said communication controller is in a transmit mode of operation, said shared memory means further including channel control block means for storing a plurality of main memory addresses, each of said plurality of main memory addresses identifying a main memory location into which said each of said data bytes is stored for transmitting to said one of said plurality of input/output devices and identifying a main memory location in which said each of said data words received from said one of said input/output devices is stored;

line microprocessor means being responsive to said one of said plurality of input/output devices requesting service during a polling operation indicative of said receive mode of operation for transferring said each of said data bytes to



said shared memory means and, said line microprocessor means being responsive to said one of said plurality of input/output devices requesting service during said polling operation indicative of said transmit operation for storing said transmit channel number of said one of said plurality of input/output devices, said line microprocessor means including first means for generating a first interrupt signal for indicating that one of said data bytes receives from said one of said input/output devices and said receive channel number or said transmit channel number of said one of said plurality of input/output devices is stored in said channel memory means; and

I/O microprocessor means responsive to said first interrupt signal for transferring said each of said data bytes stored in said shared memory for storage in said main memory at an address location specified by one of said main memory addresses stored in said shared memory means and being responsive to said transmit channel number for transferring said each of said data bytes from said address location specified by said one of said main memory addresses to said shared memory means,

said I/O microprocessor means including means for setting a flag bit in said mailbox means when said each of said data bytes received from said main memory is stored in said shared memory means;

said line microprocessor means including means for testing said flag bit, said testing means for generating a second interrupt signal when said flag bit is set, said line microprocessor means being responsive to said second interrupt signal for transferring said one of said data bytes from said shared memory means to said one of said plurality of input/output devices;

said shared memory means further storing said data bytes wherein said data bytes are transferred from said shared memory to said main memory and stored in said main memory at a location specified by one of said main memory addresses, and said data bytes are transferred from said main memory location specified by said one of said main memory addresses to said shared memory.

4,488,232

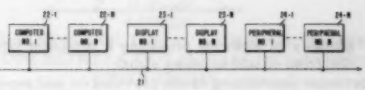
SELF-ADJUSTING, DISTRIBUTED CONTROL, ACCESS METHOD FOR A MULTIPLEXED SINGLE-SIGNAL DATA BUS

Richard E. Swaney, Fullerton, and John Hargrove, Costa Mesa, both of Calif., assignors to Hughes Aircraft Company, El Segundo, Calif.

Continuation of Ser. No. 307,971, Oct. 2, 1981, abandoned. This application May 10, 1984, Ser. No. 608,933

Int. Cl.³ G06F *15/16*

U.S. Cl. 364—200 **28 Claims**



1. A method of utilizing a data bus to transmit data between a plurality of data processing units coupled thereto, said method employing a control signal containing a control word including an identifying number which identifies a unit coupled to the bus which is to gain access to the bus, each unit having a sequence number associated therewith which identifies that particular unit in an ordered sequence of units which gain access according to said ordered sequence, said method utilized by each of said units comprising the steps of monitoring said data bus for said control words, and obtaining access to said data bus when a control word is received containing an identifying number equal to the sequence number of the unit, transmitting over said data bus as required, and relinquishing access to said data bus by transmitting a control word containing an identifying number which is changed by a predetermined value from the sequence number of said unit, wherein the improvement comprises:

self-assigning and re-assigning the sequence number of said unit in a continuous manner so as to maintain said ordered sequence of units irrespective of other units being added to or deleted from said data bus.

4,488,233

PATH INDICATING APPARATUS OF MOVING VEHICLE

Toshihiro Tsumura, 7-21, Abiko 3-Chome, Sumiyoshi-ku, Osaka-shi, Osaka-fu, Japan

Filed Sep. 28, 1981, Ser. No. 306,591

Claims priority, application Japan, Oct. 8, 1980, 55-141306

Int. Cl.³ G05D *1/00*; G06F *15/20*

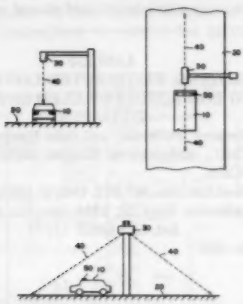
U.S. Cl. 364—424 **17 Claims**

1. A path indicating apparatus for indicating to a moving vehicle having a moving direction and a movement path in association with an intersecting line defined by a first plane and a second plane intersecting said first plane, comprising:

signal generating means provided at a predetermined fixed location spaced apart from said movement path in a direction intersecting said movement path for generating a signal having a narrow beam width;

scanning means provided at a predetermined fixed location spaced apart from said movement path in a direction intersecting said movement path for providing a scanning signal in response to said signal generated by said signal generating means and for forming a scanning plane corresponding to at least one of said first and second planes;

scanning signal detecting means including a plurality of elements each independently detecting said scanning signal from said scanning means, extending a predetermined length in a direction intersecting the moving direction of said moving vehicle and said scanning plane, each of said



plurality of elements providing a detection signal upon detection of said scanning signal;

deviation determining means provided on said moving vehicle responsive to said detection signal from said scanning signal detecting means for determining a deviation of said moving vehicle with respect to said intersecting line and providing a determination signal; and

direction indicating means provided on said moving vehicle responsive to said determination signal from said deviation determining means for indicating a direction in which said moving vehicle is to be moved.

4,488,234

METHOD OF SENSING THE CURVATURE OF A GUIDE LINE

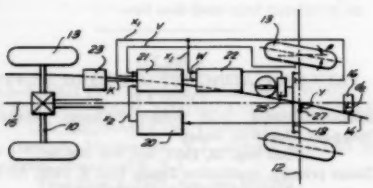
Michael Stieber, Weston, Canada, and Gunther Dreher, Munich, Fed. Rep. of Germany, assignors to MAN Maschinenfabrik Augsburg-Nurnberg AG, Munich, Fed. Rep. of Germany

Filed Nov. 12, 1981, Ser. No. 320,784

Claims priority, application Fed. Rep. of Germany, Nov. 18, 1980, 3043472

Int. Cl.³ B60K *31/00*

U.S. Cl. 364—424 **6 Claims**



1. A method of sensing the curvature of a guide line and automatically steering a vehicle thereby, comprising the steps of:

(a) determining the actual position of the vehicle with respect to the guide line and producing a signal representative thereof;

(b) estimating the position of the vehicle with respect to the guideline, by means of a simulated vehicle model using the steering angle and the guideline curvature, and producing a signal representative thereof;

(c) comparing the actual and estimated position signals and producing a difference signal representative of the difference between the two position signals,

(d) using the difference signal to estimate the curvature of the guideline, by means of a trackmodel mathematically representative of the general properties of the track, and producing a signal representative of the estimate curvature of the guideline.

(e) using the estimated curvature signal to produce a steering signal, and

(f) applying the steering signal to a control for steering the vehicle.

4,488,235

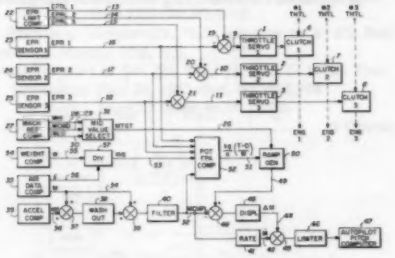
SPEED CONTROL SYSTEM FOR AIRCRAFT

Harry Miller, Scottsdale, Ariz., assignor to Sperry Corporation, New York, N.Y.

Filed Nov. 3, 1981, Ser. No. 317,823

Int. Cl.³ G05D *1/08*; G06G *7/66*

U.S. Cl. 364—433 **12 Claims**



1. Speed command apparatus for aircraft having an automatic throttle control system for controlling the thrust imparted to said aircraft by the aircraft engines and an automatic flight control system for controlling the aircraft pitch attitude, said apparatus comprising:

(a) means for providing a command signal corresponding to an aircraft speed change from an existing value to a commanded value,

(b) means responsive to said command signal for providing a ramp signal

(c) means for supplying said ramp signal to said automatic flight control system for changing the aircraft pitch attitude in accordance therewith, and

(d) means for controlling the slope of said ramp signal in accordance with the potential flight path angle of said aircraft.

4,488,236

HELICOPTER CRUISE FUEL CONSERVING ENGINE CONTROL

Terry Morrison, Vernon; James J. Howlett, North Haven, and Raymond D. Zagranski, Somers, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 16, 1982, Ser. No. 369,302

Int. Cl.³ F02C *9/08*

U.S. Cl. 364—442 **10 Claims**

6. A control for a helicopter engine having a free turbine for normally driving the helicopter rotors at a rated speed, comprising:

means for providing an actual speed signal indicative of the rotary speed of the free turbine;

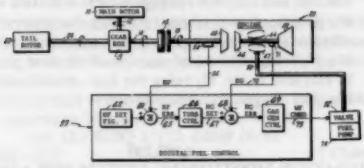
a fuel valve means for metering fuel to said engine at a rate determined by a fuel command signal applied thereto; and

a fuel controlling signal processing means connected for

response to said actual speed signal, for providing a reference speed signal indicative of desired rotary speed of the free turbine, for providing, in response to said actual speed signal and said reference speed signal, a speed error signal indicative of the difference in turbine speed indicated by said actual speed signal and said reference speed signal, for providing said fuel command signal to said fuel valve means indicative of a desired fuel flow rate as a function of said speed error signal;

wherein the improvement comprises:

said signal processing means comprising means for registering a plurality of flight parameter signals, including an



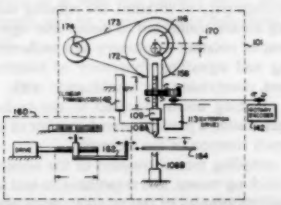
altitude signal indicative of current altitude of the helicopter, a temperature signal indicative of the current temperature of the environment outside of the helicopter, an airspeed signal indicative of the current airspeed of the helicopter, and a weight signal indicative of the current total weight of the helicopter, for providing, in response to all of said flight parameter signals, an optimum speed signal indicative of an estimated optimum free turbine speed for minimum engine fuel requirement for helicopter flight conditions indicated by said flight parameter signals, and for providing a manifestation of whether said speed reference signal indicates a speed which is respectively higher or lower than said estimated optimum free turbine speed.

4,488,237

TWO DIMENSIONAL PRESS BRAKE CONTROL SYSTEM AND APPARATUS

Herbert L. Aronson, Newton; Sidney A. Wingate, Concord; William L. Cotter, Salem, and Richard A. Brisk, Wayland, all of Mass., assignors to Dynamics Research Corporation, Wilmington, Mass.

Filed Apr. 29, 1982, Ser. No. 373,148
Int. Cl.³ B21J *9/20*
U.S. Cl. 364—476 **25 Claims**



25. A press brake controller for producing a control signal to control the ram of a press brake, said press brake controller enabling said press brake to repetitively perform a bend having a predetermined dimension value corresponding to a bend angle, each bend being initiated according to a ram control switch, said controller including:

a ram position specifier providing an averaged ram position signal corresponding to said predetermined dimension value;

a ram encoder connected to said ram providing a ram location signal;

a ram signal comparator forming a ram error signal corresponding to the difference between each said location signal and said ram position signal;

a ram error averager receiving said ram error signal and forming a ram average error signal corresponding to the average of a plurality of each said ram error signals, said plurality of ram error signals including ram error signals from a prior bend; and

a ram signal compensator forming a control signal corresponding to the sum of said ram position signal and said ram average error signal, wherein said ram encoder comprises:

incremental encoder means connected to the press brake providing sine and cosine pulse output pulse signals each having a pulse rate corresponding to the velocity of the attached press brake element motions;

digital multiplier means including:

direction detection means producing a direction output;

transition detection means receiving said sine and cosine output signal producing a rate output at a multiple of said incremental encoder pulse rate;

clock means providing periodic clock pulses; and

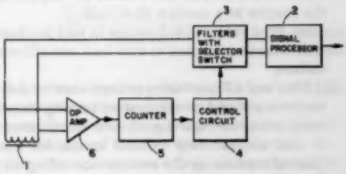
inhibit means to inhibit said transition detection means rate output signal transition when one of said sine and cosine input signals has a duration of less than one clock pulse period, wherein said direction output and said transition rate output taken together form said ram position signal.

4,488,238

SELECTION STAGE OF THE AC SIGNAL OF GREATER AMPLITUDE BETWEEN TWO SIGNALS OF DIFFERENT FREQUENCIES

Jean P. Salmon, Aulnay Sous Bois, and Daniel M. Laurent, Paris, both of France, assignors to Jeumont-Schneider Corporation, France

PCT No. PCT/FR81/00039, § 371 Date Nov. 16, 1981, § 102(e) Date Nov. 16, 1981, PCT Pub. No. WO81/02714, PCT Pub. Date Oct. 1, 1981
Pub. Date Mar. 17, 1981, Ser. No. 324,398
Claims priority, application France, Mar. 18, 1980, 80 05981
Int. Cl.³ G01R *19/00*; G06G *7/02*; H04B *1/06*
U.S. Cl. 364—483 **7 Claims**

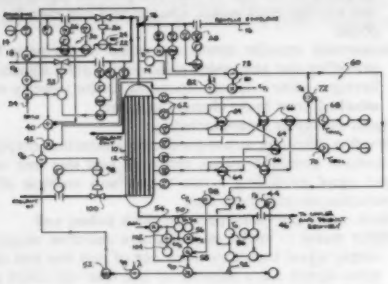


1. Apparatus for selecting the signal of greater amplitude from two alternating signals of different predetermined frequencies and different amplitudes, comprising an operational amplifier, filter means having an input and an output and being switchable to eliminate, selectively, signals of one or the other of said predetermined frequencies, means for applying the sum of said two signals to the respective inputs of said operational amplifier and said filter means, counter means connected to the output of said operational amplifier for counting the pulses in the output signal from said amplifier resulting from zero crossings of the input signal to said amplifier, the output signal from said counter means having a period corresponding to that of said signal of greater amplitude, and a control circuit connected to the output of said counter means and to said filter means, said control circuit being responsive to the output signal from said counter means for causing said filter means to switch to eliminate the one of said two signals with the lower amplitude, whereby said signal of greater amplitude is supplied to a processing device connected to the output of said filter means.

4,488,239
TEMPERATURE CONTROL SYSTEM FOR OLEFIN OXIDATION REACTOR

Suresh C. Agarwal, Euclid, Ohio, assignor to The Babcock & Wilcox Company, New Orleans, La.

Filed Apr. 22, 1982, Ser. No. 370,703
Int. Cl.³ G05D 7/00
U.S. Cl. 364—500 **2 Claims**



1. An arrangement for controlling the temperature of a reactor for containing a reaction from at least one reactant to at least one product, the reactor having a feed line for the reactant and an effluent line for the product, comprising:

a feed flow transmittter connected to the feed line for measuring the flow of reactant to the reactor;

an effluent flow transmitter connected to the effluent line for measuring the flow of product from the reactor;

a feed temperature sensor connected to the feed line for sensing the reactant temperature;

an effluent temperature sensor connected to the effluent line for measuring the product temperature;

reactor temperature sensing means connected to the reactor for measuring a temperature of reactor;

concentration sensing means connected to the effluent line for measuring the concentration of the at least one product in the effluent line;

a coolant flow line to the reactor for supplying coolant to the reactor at a coolant flow rate;

coolant flow rate control means in said coolant line; and

circuit means connected to said feed and effluent flow transmitters,

said feed and effluent temperature sensors and said reactor temperature and concentration sensing means, for generating a coolant flow signal, said circuit means connected to said coolant flow control means for controlling the flow of coolant to the reactor according to said coolant flow signal, said circuit means receiving quantities proportional to the heat of reaction for at least one reaction in the reactor, specific heats of the reactant and product, and the heat of vaporization of the coolant, said circuit means operable to subtract a quantity proportional to an amount of heat consumed in supplying reactant to the reactor from a quantity proportional to an amount of heat generated and lost in the reactor and effluent line and to divide the resulting quantity by the specific heat of the coolant to generate the coolant flow signal

wherein said circuit means is operable to generate the coolant flow signal (Q) using the formula

$$Q = \frac{1}{\lambda}\{F_2\{y_1 \Delta H_1 + y_2 \Delta H_2 + C_{Pl}(T_R - T_O)\} - F\{C_{Pl}(T_R - T_I)\}$$

where:

Q=coolant flow rate signal

λ=coolant heat of vaporization

F_2=effluent flow rate

y_1=a first product condensation

ΔH_1=heat of reaction of reactant to first product

y_2=a second product concentration

ΔH_2=heat of reaction of reactant to second product

C_{Pl}=specific heat of effluent

T_R=reactor temperature

T_O=effluent temperature

F_1=feed flow rate

C_{Pl}=specific heat of feed

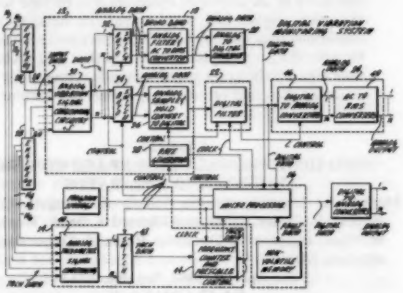
T_I=feed temperature

wherein ethylene plus oxygen is supplied to the reactor as reactant and ethylene oxide plus carbon dioxide and water are generated as products, y_1 being the concentration of ethylene oxide, y_2 being the concentration of carbon dioxide, H_1 being the heat of reaction of ethylene plus oxygen to ethylene oxide, H_2 being the heat of reaction of ethylene plus oxygen to carbon dioxide.

4,488,240
VIBRATION MONITORING SYSTEM FOR AIRCRAFT ENGINES

Nikul S. Kapadia, El Toro, and David J. Ray, San Juan Capistrano, both of Calif., assignors to Becton, Dickinson and Company, San Juan Capistrano, Calif.

Filed Feb. 1, 1982, Ser. No. 344,561
Int. Cl.³ G01N 29/04; G06J 1/00
U.S. Cl. 364—508 **12 Claims**



10. Apparatus to monitor rotating machinery for incipient failures signalled by increased vibration at frequencies related to the frequency of rotation, the rotating machinery including sensing means connected to detect and signal vibrations of an element of rotating machinery and tachometer means for detecting and signalling frequency of rotation of the rotating element, comprising the combination with;

(a) clocking means coupled to the tachometer means for generating a predetermined number of sampling pulses for each rotation of the element;

(b) sampling means coupled to the sensing means and said clocking means, and responsive to said sampling pulses for gating samples of the sensing means signals;

(c) digital conversion means coupled to said sampling means for producing digital signals corresponding to and representative of sensing means signal samples of sensed rotating element vibrations;

(d) nonrecursive digital filter means coupled to said digital conversion means and operable in response to applied digital signals representing each digitized sample to produce filter output digital signals corresponding to and representative of vibrations of the rotating element occurring at the frequency of rotation; and

(e) signal processing means connected to receive the signal output of said digital filter means for converting said filter output digital signals to analog signals and for generating

a signal representative of a desired descriptor of the quantity represented by the filter output digital signal;

whereby desired descriptor analog signals corresponding to and representative of periodic machine vibration can be displayed or further processed.

4,488,241

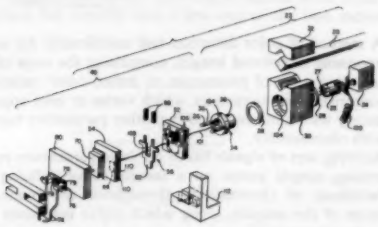
ROBOT SYSTEM WITH INTERCHANGEABLE HANDS

Burleigh M. Hutchins, Hopkinton, and Louis Abrahams, Worcester, both of Mass., assignors to Zymark Corporation, Hopkinton, Mass.

Continuation-in-part of Ser. No. 328,727, Dec. 8, 1981,. This application Mar. 8, 1982, Ser. No. 355,349

Int. Cl.³ B23Q *3/155*; G05B *19/42*

U.S. Cl. 364—513 **7 Claims**



1. In a robot system comprising a robot arm permanently attached to said system, and (a) computer control means to control said robot arm and wherein (b) said robot arm is powered responsive to said control means and (c) manipulator means attached to said permanent robot arm,

the improvement wherein said robot system comprises means for automatically attaching and detaching said manipulator means from said arm under computer controlled action of said robot system

wherein said computer means comprises means to send data to said manipulator means through said robot, including data for operation of at least one control motor on said manipulator means, and to receive output data from manipulator means.

4,488,242

ROBOT ARM CONTROL METHOD USING OPEN LOOP CONTROL IN COMBINATION WITH CLOSED LOOP CONTROL

Fumio Tabata, Yokohoma; Kazuo Asakawa, Kawasaki, and Hitoshi Komoriya, Machida, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

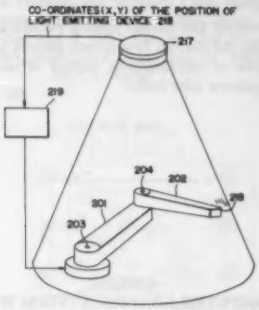
Filed Dec. 21, 1981, Ser. No. 333,056

Claims priority, application Japan, Dec. 22, 1980, 55-182458

Int. Cl.³ G06F *15/46*; G05B *19/22*

U.S. Cl. 364—513 **9 Claims**

1. An arm locus control method, comprising the steps of: driving a first arm of a two-joint arm under open-loop control, and placing a second arm under feedback control by using a control signal proportional to the product of a first value obtained by substituting a coordinate value of a tip of the second arm for a variable in a function representing a locus along which the tip of the second arm is to follow and a second



value obtained by substituting the coordinate value of the tip of the second arm for a variable in a derivative of the function.

4,488,243

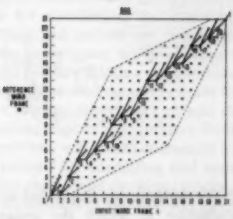
DYNAMIC TIME WARPING ARRANGEMENT

Michael K. Brown, Piscataway, and Lawrence R. Rabiner, Berkeley Heights, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 3, 1982, Ser. No. 374,307

Int. Cl.³ G10L *1/00*

U.S. Cl. 364—513.5 **22 Claims**



1. A method for time aligning a first speech pattern with a second speech pattern comprising the steps of:

generating a time frame sequence of signals representative of the acoustic features of the first speech pattern,

generating a time frame sequence of signals representative of the acoustic features of the second speech pattern, and

pairing each first speech pattern time frame with one of the second speech pattern time frames responsive to the first speech pattern feature signals and the second speech pattern feature signals,

the time frame pairing comprising;

generating a series of signals representative of the succession of first speech pattern time frames,

responsive to each successive first speech pattern time frame signal, performing the steps of,

generating a set of signals corresponding to second speech pattern candidate time frames for the current first speech pattern time frame,

generating a set of signals representative of the correspondence between the acoustic feature signals of the current first speech pattern time frame and the acoustic feature signals of the second speech pattern candidate time frames,

generating a signal for each second speech pattern candidate time frame and the current first speech pattern time frame predictive of the similarity of the first and second speech patterns along a path including the second speech pattern

candidate time frame and current first speech pattern time frame responsive to the correspondence signals of the preceding and current first speech pattern time frames, and

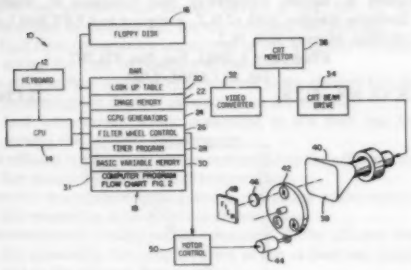
selecting one of the second speech pattern candidate time frames for the current first speech pattern time frame pair responsive to the predictor signals of the current first speech pattern time frame.

4,488,244

COMPUTER GRAPHIC SYSTEM WITH FOREGROUND/BACKGROUND DISCRIMINATION

William T. Freeman, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Jun. 7, 1982, Ser. No. 385,695
Int. Cl.³ H04N *1/46*
U.S. Cl. 364—525 **12 Claims**



1. In a system for defining and displaying an image for photographic reproduction in which the image to be photographed is defined and stored within a computer memory as a plurality of constant color pixel groups and in which each constant color pixel group is displayed to expose a selected photosensitive material at a selected uniform light color and intensity for the appropriate exposure time and in which the time during which the selected photosensitive material should be exposed at the selected light color and intensity is determined for each of the constant color pixel groups and in which the determined exposure times are ordered into a progressively decreasing sequence so that the constant color pixel groups can be displayed to expose the photosensitive material in the ordered sequence starting with the first of the constant color pixel groups in the ordered sequence having the longest exposure time and thereafter adding succeeding constant color pixel groups in the ordered sequence so as to finally display all of the constant color pixel groups, the improvement comprising:

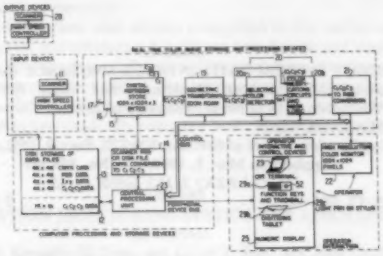
means for providing a selected ordered foreground to background relationship between the constant color pixel groups such that said selected ordered foreground to background relationship is maintained in the exposure of the photosensitive material to the overlapping areas between the constant color pixel groups wherein said means for providing said selected ordered foreground to background relationship erases those portions of each constant color pixel group which are overlapped by another constant color pixel group yet to be displayed because of its succeeding position in the ordered sequence.

4,488,245

METHOD AND MEANS FOR COLOR DETECTION AND MODIFICATION

George W. Dalke, Overland Park, Kans., and Peter C. Pugsley, Pinner, England, assignors to LogE/Interpretation Systems Inc., Overland Park, Kans.

Filed Apr. 6, 1982, Ser. No. 366,027
Int. Cl.³ G03F *3/08*; G01N *21/25*
U.S. Cl. 364—526 **45 Claims**



1. A method of color detection and modification for use in the processing of colored images, comprising the steps of:

a. selecting a set of parameters to define color variations, comprising one parameter which varies at least approximately with luminance and two other parameters varying with chromaticity;

b. deriving sets of signals based on these parameters representing sample points on a sample curve defining the variations of chromaticity throughout the luminance range of the samples, along which curve maximum correction is required;

c. obtaining a succession of sets of input signals based on said parameters, each set representing an element of the original image to be reproduced;

d. obtaining from each of said sets of input color signals

(1) a luminance factor signal;

(2) chromaticity deviation signals representing the differences respectively between the signal values for the said other two parameters of the obtained set and their respective values on an extended curve which extends from the said sample curve to cover the entire luminance range of the input color signals, the values being taken at a point on the curve defined by the luminance value of the obtained set of signals;

(3) deriving from the chromaticity deviation signals and the luminance factor signal a weighting signal whose value is a predetermined function of said signals.

e. combining each of a predetermined set of color correction values with the weighting signal to derive a set of modified color correction values;

f. combining each of the said set of modified color correction values with its corresponding set of input color signals to produce corrected output color signals; and

g. wherein the succession of sets of output color signals represents the original image with selective color enhancement.

4,488,246

INTEGRATED LOGIC NETWORK WITH SIMPLIFIED PROGRAMMING

Jean M. Brice, Grenoble, France, assignor to Societe pour l'Etude et la Fabrication des Circuits Integres Speciaux, Grenoble, France

Filed Oct. 27, 1981, Ser. No. 315,508
Claims priority, application France, Nov. 3, 1980, 80 23463
Int. Cl.³ G06F *7/38*
U.S. Cl. 364—716 **4 Claims**

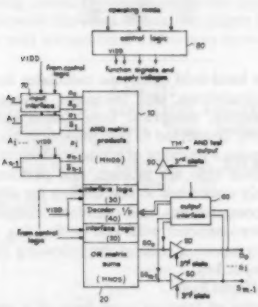
1. An electrically programmable integrated logic array comprising n inputs for variables (Ai), m outputs (Si) for logic

combinations of the variables, a programmable product matrix having 2n×p programmable elements arranged in 2n lines and p columns and having n pairs of inputs and p outputs for supplying p intermediate products of said variables, and a programmable sum matrix having m×p programmable elements arranged in p lines and m columns and having p inputs connected through an interface logic circuit respectively to said p outputs of said product matrix, said sum matrix having also m outputs connected through an output interface circuit to said m outputs of the array, a logic control circuit for supplying to the array reading mode control signals and writing mode control signals among which two successive writing mode control signals (VA1, VA2) providing a two step transmission of said variables from each of the n inputs for variables to a respective pair of inputs of said product matrix, said array further including a decoder connected to said interface logic circuit for selecting a given output of said product matrix and a respective input of said sum matrix, and an input interface circuit controlled by said logic control circuit and connected to said n inputs for variables and supplying signals to each of the 2n inputs of said product matrix, wherein said input interface circuit comprises, for each input for variable,

a first latching circuit receiving a logical level from said input for variable and a first one of the two successive writing mode control signals, and supplying, after reception of said first signal, a first programming signal on a first input of a pair of inputs of said product matrix, for programming the elements of a line of the product matrix corresponding to this first input,

a second latching circuit receiving a logical level from said input for variable and a second one of the two successive writing mode control signals, and supplying, after reception of said second signal, a second programming signal on a second input of said pair of inputs of said product matrix, for programming the elements of a line of the product matrix corresponding to the second input,

at least one by-pass gate controlled by said reading mode control signals for transmitting directly, in a reading mode, a logical level present on said input for variable to one input of said pair of inputs of said product matrix and a complementary logical level to the other input of said pair, and wherein said interface logic circuit between the product and sum matrix receives writing control signals for supplying programming signals, in a writing mode, to a selected output of said product matrix and to a respective input of said sum matrix, for programming the elements of a column of the product matrix and of a corresponding line of the sum matrix.

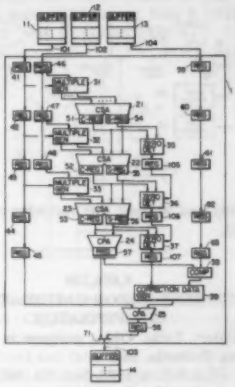


4,488,247

CORRECTION CIRCUIT FOR APPROXIMATE QUOTIENT

Yasuhiro Inagami, Hadano; Shigeo Nagashima, Hachioji; Koichiro Omoda, Hadano, and Shunichi Torii, Musashino, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 7, 1982, Ser. No. 366,325
Claims priority, application Japan, Apr. 15, 1981, 56-55549
Int. Cl.³ G06F 7/52
U.S. Cl. 364—765 **9 Claims**



8. A circuit for correcting an approximate quotient obtained on the basis of a given divisor and a given dividend, comprising multiplier means for calculating the product between said approximate quotient and said divisor, means including a first decision circuit for determining whether or not first predetermined digits of said product fulfills a predetermined first condition, means including a second decision circuit for determining whether or not a predetermined digit of said dividend and a second predetermined digit of said product fulfills a predetermined second condition, and means connected to said first and second decision circuits for correcting said approximate quotient when said first and second decision circuits deliver signals indicative of the fulfillments of said first and second conditions, respectively.

4,488,248

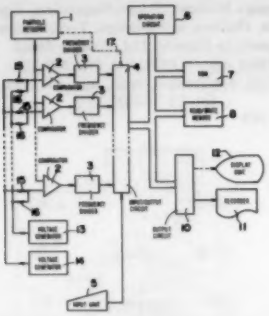
PARTICLE SIZE DISTRIBUTION ANALYZER

Tokuhiro Okada, Kakogawashi; Masayoshi Hayashi, Kobe, and Hideaki Matsumoto, Takasagoshi, all of Japan, assignors to Toa Medical Electronics Co., Ltd., Kobe, Japan

Continuation-in-part of Ser. No. 213,223, Dec. 5, 1980, abandoned. This application Dec. 10, 1982, Ser. No. 448,429
Int. Cl.³ G06F 15/42
U.S. Cl. 364—555 **8 Claims**

1. A particle size distribution analyzer comprising a particle detector adapted to produce signals in response to the sizes of particles by electrical or optical differences between a liquid and the particles dispersed therein, at least one reference voltage generator which produces a signal, a plurality of comparators connected in parallel to said particle detector and to said reference voltage generator, said comparators comparing the signal from said particle detector to the signal from said reference voltage generators and producing pulses in correspondence with said comparison, counters connected to each of said comparators for counting said pulses produced from said comparators, an input/output circuit which receives signals sent from said counters, an input unit connected to said input-/output circuit operative to enable pre-selected conditions to be input from the outside, a computer assembly connected to said input/output circuit, said computer assembly comprising a

central processing unit, a read only memory, and a random access mamory, a data output circuit connected to said com-



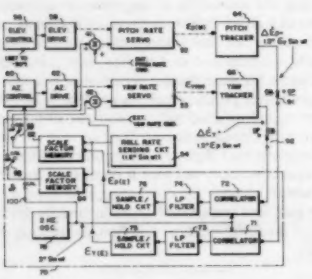
puter assembly and at least one recorder connected to said output circuit.

4,488,249

ALIGNMENT ERROR CALIBRATOR AND COMPENSATOR

Edward B. Baker, Tulsa, Okla., assignor to Martin Marietta Corporation, Bethesda, Md.

Filed Feb. 4, 1982, Ser. No. 345,892
Int. Cl.³ G01C *25/00, 21/18*
U.S. Cl. 364—571 **12 Claims**



1. In an airborne optical target acquisition and tracking system having an optical subsystem disposed on a stabilized platform, said platform controlled by an elevation drive, an azimuth drive, a roll rate sensing circuit, a pitch rate servo, and a yaw rate servo, apparatus for calibrating and compensating the system for misalignment between the stabilization axis of said platform and the axis of said optical subsystem comprising:

(a) scaling means connected to said roll rate sensing circuit to receive roll rate signals therefrom, and having pitch error signal output connected to said yaw rate servo, and yaw error signal output connected to said pitch rate servo, said scaling means for producing an error singal at said pitch error signal output proportional to the yaw component of said misalignment, and an error signal at said yaw error signal output proportional to the pitch component of said misalignment; and

(b) calibration means including

(i) low frequency oscillator means connected to said azimuth drive for moving said platform in yaw, thereby producing a roll rate proportional to said misalignment and a roll rate signal from said roll rate sensing circuit for calibration of said system,

(ii) first adjustment means connected to said scaling means for adjusting said pitch error signal output due to said low frequency oscillator to compensate for an azimuthal component of said misalignment, and

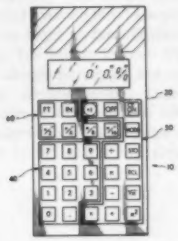
(iii) second adjustment means connected to said scaling means for adjusting said yaw error signal output due to said low frequency oscillator to compensate for an elevational component of said misalignment.

4,488,250

HAND-HELD CALCULATOR FOR PERFORMING CALCULATIONS IN FEET, INCHES AND FRACTIONS

William S. Lipsey, P.O. Box 3203, and Henry B. Teague, P.O. Box 4684, both of Aspen, Colo. 81611

Filed Jul. 2, 1982, Ser. No. 394,515
Int. Cl.³ G06F *3/02, 3/14*
U.S. Cl. 364—709 **9 Claims**



1. A portable hand-held electronic calculator for feet, inch, and fraction calculations, said calculator having a housing containing a display, numerical keys, functional keys, and means operatively connected to said numerical and functional keys for performing a plurality of predetermined computations based upon which keys are pressed, said performing means being operatively connected to said display for displaying the results of said computations, said calculator comprising:

field keys interconnected with said performing means, said field keys comprising each of the following input keys:

(a) a feet input key,

(b) an inch input key,

(c) a plurality of fraction input keys of a predetermind series of fractions where the numerator is preselected from said numerical keys, each of said input keys being capable of selective manual activation,

means in said display for indicating feet, inches, and fractions, and

means in said performing means receptive of a number from said numerical keys and then responsive to the selective manual activation of any one of said input keys in said field keys for displaying the aforesaid number in the selected feet, inches, or fractions in said display with said indications, said performing means being further capable of determining said computations of feet, inches, and fractions.

4,488,251

DIGITAL FILTER

Gerhard Wischermann, Darmstadt, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Apr. 20, 1982, Ser. No. 370,089
Claims priority, application Fed. Rep. of Germany, May 29, 1981, 3121310
Int. Cl.³ G06F *7/38, 15/31;* H04N *3/24*
U.S. Cl. 364—724 **10 Claims**

1. A digital filter which operates upon n+1 consecutive sampled values of a digital signal, the filter defining a signal path from an input (1) to an output (5, 5') comprising

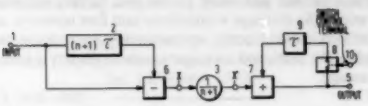
means (6) for forming the difference between each sampled value of the digital signal applied to the input (1), and that

sampled value preceding the first-mentioned by n+1 sampling periods;

means (7, 9) for receiving the so-formed differences and for accumulating the so-formed differences and applying said accumulated difference to an output (5),

wherein the difference-forming means (6) comprises

means for connecting the input (1) of the digital filter via a first path to a first input of a subtracting circuit (6) and via a second path having a delay of n+1 sampling periods relative to the first path to a second input of the subtracting circuit (6),



wherein the accumulating means (7, 9) comprises

an adding circuit (7) having a first input connected to the output of the subtracting circuit (6) and a second input connected to the output of the adding circuit via a path (9) providing a delay of one sampling period, the output from the adding circuit also forming the output (5, 5') of the filter;

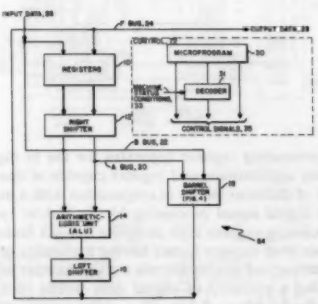
and dividing means (3) connected in the signal path of the filter between the input (1) and the output (5, 5') for dividing the said accumulated differences by n+1.

4,488,252

FLOATING POINT ADDITION ARCHITECTURE

Edward R. Vassar, Framingham, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Feb. 22, 1982, Ser. No. 350,860
Int. Cl.³ G06F 7/50
U.S. Cl. 364—748 **63 Claims**



1. In combination:

shifter means for performing a floating pooint addition operation comprising alignment and normalization functions wherein a digital word passes through said shifter means only once to accomplish each of said functions;

said shifter means including a single digit shifter means for shifting digits within said digital word one place during said operation;

said shifter means further including a multiple digit shifter means coupled to said single digit shifter means for shifting digits within said digital word a plurality of places, said multiple digit shifter means being traversed by said digital word no more than one time during said floating point addition operation; and

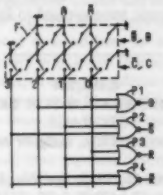
arithmetic means for performing an add function during said floating point addition operation, said arithmetic means being coupled to said shifter means whereby said digital word is not required to pass through said arithmetic means solely to gain access to said multiple digit shifter means.

4,488,253

PARALLEL COUNTER AND APPLICATION TO BINARY ADDERS

Claude P. H. Lerouge, Maurepas, France, assignor to ITT Industries, Inc., New York, N.Y.

Filed Apr. 30, 1982, Ser. No. 373,458
Claims priority, application France, May 8, 1981, 81 09166
Int. Cl.³ G06F 7/50
U.S. Cl. 364—786 **10 Claims**



6. A parallel counter for providing an output signal indicative of the number of applied individual input signals having a given logic state, comprising:

at least first second and third data input terminals on which first, second and third input signals are applied;

at least first, second, third and fourth data output terminals;

at least first, second, third, fourth, fifth, sixth and seventh switch circuits, each of said circuits including a pair of solid state switch devices, each of said switch devices including a pair of principal electrodes and a control electrode, said control electrodes being connected to a common switch circuit input terminal and being adapted to operate in opposite conduction states in response to a control signal applied to said switch circuit control terminal;

said principal electrodes of said first switch device in each of said switch circuits being connected between a switch circuit input terminal and a switch circuit output terminal, said principal electrodes of said second switch device being connected between a switch circuit branch terminal and said switch circuit output terminal;

the input terminal of said first switch circuit being coupled to said first data input terminal as to provide the compliment of the signal thereon to said first switch circuit, the output terminal of said first switch circuit being connected to the input terminal of said second switch circuit, the output terminal of said second switch terminal being connected to said first data output terminal, the input terminal of said third switch circuit being connected to said first data input as to provide the signal thereon to said third switch circuit, the output terminal of said third switch circuit being connected to the input terminal of said fourth switch circuit, the output terminal of said fourth switch circuit being connected to said second data output terminal, the input terminal of said fifth switch circuit being connected to circuit ground, the output terminal of said fifth switch circuit being connected to the input of said sixth switch circuit, the output terminal of said sixth switch circuit being connected to said third data output terminal, the input terminal of said seventh switch circuit being connected to circuit ground, the output of said seventh switch circuit being connected to said fourth data output terminal, the branch input terminals of said first and second switch circuits being connected to circuit ground, the branch input terminal of said third switch circuit being connected to said input terminal of said first switch circuit, the branch input terminal of said fourth switch circuit being connected to said output terminal of said first switch circuit, the branch input terminal of said

fifth switch circuit being connected to said input terminal of said third switch circuit, the branch input terminal of said sixth switch circuit being connected to said output terminal of said third switch circuit, the branch input terminal of said seventh switch circuit being connected to said output terminal of said fifth switch circuit;

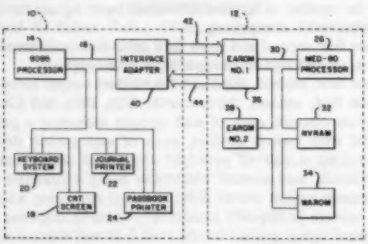
the control terminals of said first, third and fifth switch circuits being connected to said second data input terminal;

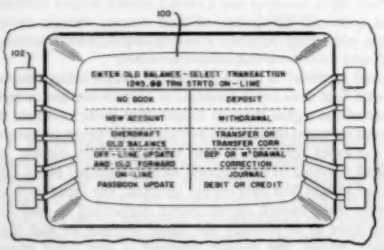
the control terminals of said second, fourth, sixth and seventh circuits being connected to said third data input terminal, whereby a logic signal is produced at said output terminals indicative of the number of input signals of a predetermined logic state applied to said data input terminals.

4,488,254
METHOD AND APPARATUS FOR EFFICIENT DATA STORAGE

Stephen W. Ward, Dayton, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed Mar. 26, 1980, Ser. No. 134,257
Int. Cl.[3] G06F *3/00, 3/14*
U.S. Cl. 364—900 4 Claims





1. An apparatus for displaying messages on a display device in which each message is a display comprised of a plurality of individual message words in at least one line, comprising:

a first addressable message word memory for individually storing each of said message words contained in said messages, with each word comprising a plurality of binary-coded characters;

a second addressable word pointer memory for storing the address of the first binary-coded character in each of said message words stored in said first memory;

a third addressable memory for storing a plurality of data code representations, each of which points to an address in said second memory which in turn provides an address for said message words which define a particular message to be displayed, and also for storing a plurality of control code representations which define the relative positioning of said message words with respect to each other on said display device;

a buffer for storing assembled message words for subsequent display on said display device;

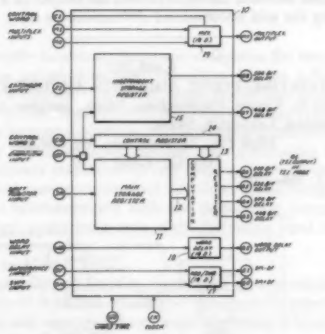
data bus means operatively coupling said first, second and third memory means and said buffer;

and data processor means coupled by said data bus means to said first, second and third memory and to said buffer for addressing said third addressable memory to obtain said data and control code representations and to use said data code representation to address said second memory to obtain further addresses, to use said further addresses to retrieve the message words from said first memory, and to use said control code representation to position in said buffer the retrieved message words to display a particular message.

4,488,255
PROCESSING REGISTER APPARATUS FOR USE IN DIGITAL SIGNAL PROCESSING SYSTEMS

Dale L. Krisher, and Sirus Chitsaz, both of Raleigh, N.C., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Oct. 22, 1981, Ser. No. 313,916
Int. Cl.[3] G06F *3/00, 5/00*
U.S. Cl. 364—900 18 Claims



1. A processing register apparatus for use in digital signal processing applications, said register capable of operating in a plurality of different modes in conjunction with a multiplier to perform digital signal processing blocks and/or systems, the said processing register is to comprise but not limited to:

(a) main shift register means having a plurality of stages for receiving and storing therein a given number of bits manifesting a plurality of digital data words each having a smaller number of bits of a given value, said register adapted to receive at an input a digital data signal manifesting said plurality of digital words, and to provide said words at output;

(b) control register means coupled to said main register means having a plurality of stages and adapted to receive a control word of said given value of bits with predetermined bits indicative of any one of given number of modes of operation for said register and with predetermined selected ones of said bits indicative of control signals for selecting any one stage of said main shift register manifesting a given delay according to said selected stage;

(c) a storage register having a plurality of stages for receiving and storing therein a different number of given bits than said main register, manifesting a smaller plurality of digital data words each of the same number of bits of said given value and

overflow means coupled to said main and storage registers to set said given value of bits indicative of any digital

word stored to one binary logic value in either said main or second storage registers;

mode selector means coupled to said control register and responsive to said bits to provide a plurality of control signals indicative of a separate mode of operation for said processing register.

4,488,256

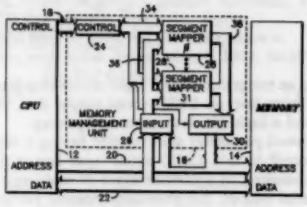
MEMORY MANAGEMENT UNIT HAVING MEANS FOR DETECTING AND PREVENTING MAPPING CONFLICTS

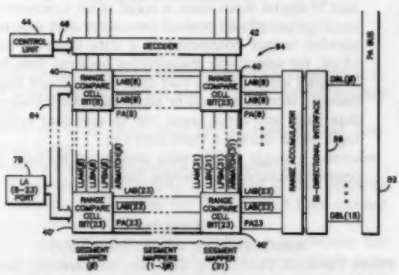
John E. Zolnowsky; William M. Keshlear, and Richard D. Crisp, all of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

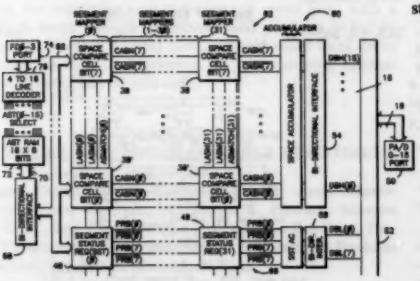
Continuation-in-part of Ser. No. 324,281, Nov. 23, 1981, abandoned. This application Dec. 14, 1981, Ser. No. 330,051

Int. Cl.³ G06F *13/00*

U.S. Cl. 364—900 **9 Claims**







1. In a memory management unit for selectively mapping a logical address to a respective physical address in accordance with a selected one of a plurality of stored segment descriptors, each segment descriptor comprising:

a logical address mask which defines the bits of the logical address which are to be considered significant and which are to be considered insignificant for the purpose of said mapping; a

logical base address which defines a logical base address against which the significant bits of the logical address are to be compared; and

a physical base address which defines the physical address into which the insignificant bits of the logical address are to be substituted;

a circuit for detecting mapping conflicts between a new segment descriptor and said stored segment descriptors, comprising:

logic means for comparing only the bits of the logical base address of said new segment descriptor which are indicated as being significant by the bits of the logical address mask of said new segment descriptor to the corresponding bits of the logical base address of each of said stored segment descriptors which are indicated as being significant by the respective logical address masks of said stored segment descriptors, and for providing a match signal indicative of the detection of one of said mapping conflicts only in response to none of said significant logical base address bits of said new segment descriptor being different from the corresponding significant logical base address bits of any one of the stored segment descriptors.

4,488,257

METHOD FOR CONFIRMING INCORPORATION OF A MEMORY INTO MICROCOMPUTER SYSTEM

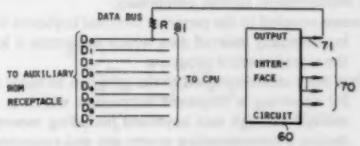
Akio Hosaka, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jan. 11, 1982, Ser. No. 338,647

Claims priority, application Japan, Jan. 12, 1981, 56-002063

Int. Cl.³ G06F *13/00*

U.S. Cl. 364—900 **6 Claims**



1. A method of confirming that a memory device is electrically incorporated into a computer, comprising the following steps:

(a) storing a predetermined bit having a first logical value at a predetermined address in said memory device;

(b) predefining at least one bit line of a common parallel output data bus connected between a receptacle means for receiving the memory device and a central processing unit of the computer such that said bit line connected to the central processing unit will give a second logical value different from said first logical value if the memory device is not electrically incorporated into the computer;

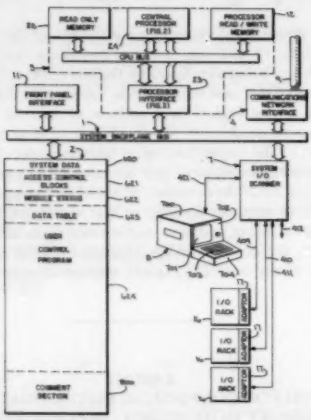
(c) operating the central processing unit to attempt to access the predetermined address of the memory device so as to fetch the predetermined bit stored in the predetermined address of the memory device; and

(d) operating the central processing unit to read all logical values on the common parallel output data bus and to compare the read logical value from the predefined bit line with said first logical value, whereby the central processing unit confirms that the memory device is electrically incorporated into the computer via the receptacle means when the read logical value on the predefined bit line equals said first logical value.

4,488,258
PROGRAMMABLE CONTROLLER WITH CONTROL PROGRAM COMMENTS

Odo J. Struger, Chagrin Falls, and Jon F. Gray, Eastlake, both of Ohio, assignors to Allen-Bradley, Milwaukee, Wis.

Filed Sep. 20, 1982, Ser. No. 420,023
Int. Cl.³ G06F 9/06
U.S. Cl. 364—900 4 Claims



1. In a programmable controller system which includes a processor that executes a control program stored in the processor's memory to operate a machine and a program terminal which is coupled to the processor's memory to enable a user to enter and edit the stored control program through a keyboard and to display the stored control program on a display device, the improvement therein comprising:

means coupled to the program terminal keyboard for receiving manually entered data which designates a location in the stored control program;

first input means coupled to the program terminal keyboard for receiving a comment instruction which is manually entered through said keyboard including means for producing a corresponding mnemonic and comment number which are written into the designated location in the stored control program;

comment storage means coupled to the program terminal;

second input means coupled to the program terminal keyboard for receiving comment data and an associated comment number including means for writing said comment data and associated comment number into said comment storage means;

means coupled to the program terminal display device for reading stored control program instructions and displaying symbolic representations of the control program instructions which includes:

(a) means for detecting the comment instruction mnemonic when read from the stored control program for display;

(b) means responsive to the comment number stored with the detected comment instruction mnemonic for fetching the corresponding stored comment data from the comment storage means; and

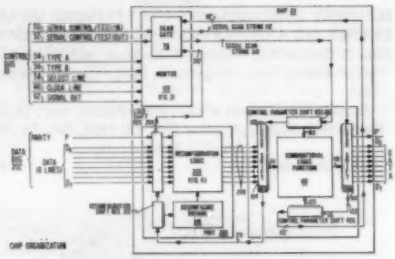
(c) means for applying the fetched comment data to the program terminal display device for displaying the same to the user;

wherein the processor includes means for inhibiting the execution of the comment instructions stored in the control program.

4,488,259
ON CHIP MONITOR

Brian R. Mercy, Warrenton, Va., assignor to IBM Corporation, Armonk, N.Y.

Filed Oct. 29, 1982, Ser. No. 437,775
Int. Cl.³ G06F 1/00
U.S. Cl. 364—900 10 Claims



1. In an integrated digital logic circuit chip having an LSSD serial input line, an LSSD serial output line, N digital input lines and a logic block thereon, comprising:

a control parameter shift register having a serial input connected to said LSSD serial input line, a parallel output connected to a control input of said logic block, and a serial output, for providing control parameters to said logic block during a first interval;

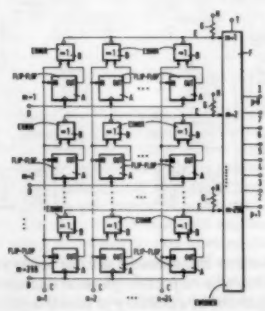
an LSSD shift register having a parallel input connected to said N digital input lines, a serial input connected to said serial output of said control parameter shift register, and a parallel output connected to a data input of said logic block, for selectively transferring operand data from said N digital input lines to said data input of said logic block during a second interval or alternately for transferring test data from said serial input line to said data input of said logic block during a third interval;

whereby a single LSSD scan string can be used for both control functions and testing functions.

4,488,260
ASSOCIATIVE ACCESS-MEMORY

Pierre Cantarel, Heidelberg, Fed. Rep. of Germany, assignor to Brown, Boveri & Cie AG, Mannheim, Fed. Rep. of Germany

Filed Feb. 12, 1982, Ser. No. 348,280
Claims priority, application Fed. Rep. of Germany, Feb. 14, 1981, 3105503
Int. Cl.³ G11C 15/00
U.S. Cl. 365—49 10 Claims



1. Associative access-memory, comprising flip-flops as memory cells being disposed in a matrix having m rows and n

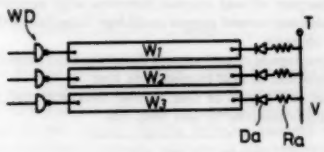
columns and each having an input, an output and a dynamic input, each of the rows serving to accept an n-bit-wide memory word and to store m memory words, EXNOR members each being associated with one flip-flop and each having first and second inputs and an output, n memory inputs disposed in columns, said input of each flip-flop and said first input of said EXNOR member associated therewith being connected to a respective one of said n memory inputs, said output of each flip-flop being connected to said second input of said EXNOR member associated therewith, m memory inputs disposed in rows, said dynamic input of each flip-flop being connected to a respective one of said m memory inputs, m bus lines disposed in rows, said output of each EXNOR member being connected to a respective one of said bus lines, and voltage sources each being connected to one of said bus lines.

4,488,261

FIELD PROGRAMMABLE DEVICE

Kouji Ueno, and Tamio Miyamura, both of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 1, 1982, Ser. No. 353,356
Claims priority, application Japan, Mar. 2, 1981, 56-29727
Int. Cl.³ G11C *11/40*
U.S. Cl. 365—104 **7 Claims**



1. A field programmable device operatively connected to receive a programming current and a power source voltage comprising:

a plurality of word lines each having selected and non-selected states;

a plurality of bit lines intersecting said word lines;

word driver means, operatively connected to said plurality of word lines, for selecting one of said word lines and not selecting the other said word lines;

a plurality of cells operatively connected to receive the programming current and, respectively, operatively connected at the intersections of said word lines and said bit lines, said cells and said word lines forming parasitic P-N-P-N elements; and

voltage supply means, operatively connected to said word lines, for supplying said non-selected word lines with a voltage large enough to prevent said parasitic P-N-P-N elements, formed by said cells and said word lines, from turning on, and for hindering the programming current from flowing out of said cells.

4,488,262

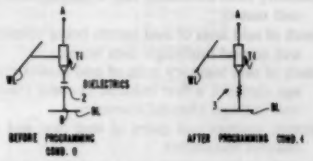
ELECTRONICALLY PROGRAMMABLE READ ONLY MEMORY

Dominique Basire, Chailly-En-Biere, France; Arup Bhattacharyya, Essex Junction, Vt.; James K. Howard, Morgan Hill, Calif., and Pierre Mollier, Boissise-Le-Roi-Saint Fargeau Ponthierry, France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 17, 1982, Ser. No. 389,204
Claims priority, application European Pat. Off., Jun. 25, 1981, 81430019.0
Int. Cl.³ G11C *11/40*
U.S. Cl. 365—104 **10 Claims**

1. In an electrically programmable read only memory including a matrix of first and second type information lines, the matrix having memory cells located at the intesections of at least some of the first and second type information lines and means for storing information in the cell, the improvement comprising:

a memory cell having a transistor including collector, base and emitter regions, the base region of the transistor being connected to an information line of the first type and the collector region being adapted to be connected to a variable voltage supply, the memory cell also including a dielectric layer which is an oxide or titanate of a transition



metal having a first surface directly overlying at least a portion of the transistor emitter region and a second surface in electrical communication with an information line of the second type; and

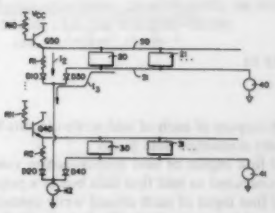
means for electrically puncturing the dielectric layer at selected cells to establish an ohmic contact between the transistor emitter region and the second type information line when storing information in the cell.

4,488,263

BYPASS CIRCUIT FOR WORD LINE CELL DISCHARGE CURRENT

William H. Herndon, Sunnyvale, and Jonathan J. Stinehelfer, San Jose, both of Calif., assignors to Fairchild Camera & Instrument Corp., Mountain View, Calif.

Filed Mar. 29, 1982, Ser. No. 363,198
Int. Cl.³ G11C *11/40*
U.S. Cl. 365—189 **14 Claims**



1. In a semiconductor memory, a bypass circuit for diverting a flow of word line discharge current from memory cells of a selected word line and from an upper word line conductor to a word line discharge current sink, comprising:

a resistor having a first terminal connected to said upper word line conductor; and

a diode connected in series with said resistor, said diode being connected between a second resistor terminal and said word line discharge current sink.

4,488,264

TRANSISTOR STORAGE

Valery L. Dshkhunian, K-482, korpus 338A, kv. 73; Sergei S. Kovalenko, K-498, korpus, 421, kv. 3; Pavel R. Mashevich, K-482, korpus 338"A", kv. 139, and Vyacheslav V. Telenkov, K-527, korpus 811, kv. 75, all of Moscow, U.S.S.R.

Filed Jun. 10, 1982, Ser. No. 387,049
Int. Cl.³ G11C *13/00*
U.S. Cl. 365—189 **4 Claims**

1. A transistor storage intended for simultaneously writing,

storing and reading information in two directions, which corresponds to simultaneously reading information off two columns of a matrix of memory cells with different addresses, comprising:

a first multidigit data bus; a second multidigit data bus;

an input multidigit data bus; an output multidigit data bus;

a write bus;

a read bus;

a multidigit address bus;

memory cells combined into a matrix; lines and columns of said matrix;

each of said lines of said matrix being connected to said first and second multidigit data buses;

each of said memory cells of said matrix comprising a storage element, a first induced channel transistor and a second induced channel transistor;

drains, sources and gates of said first and second induced channel transistors;

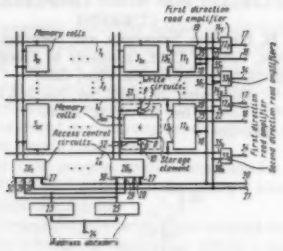
paraphase inputs/outputs of said storage element;

said drains of said first and second induced channel transistors being electrically coupled to said paraphase inputs-/outputs or said storage element;

said sources of said first and second induced channel transistors being connected to said first and second multidigit data buses;

write circuits; a first input, a second input, a third input, and outputs of each of said write circuits;

read amplifiers of a first readout direction; a first input, a second input, and outputs of each of said first direction read amplifiers;



said outputs of each of said write circuits being connected to said multidigit data buses;

said first inputs of said first direction read amplifiers being connected to said first data bus of a respective matrix line;

said first input of each of said write circuits being connected to said input multidigit data bus;

said output of each of said first direction read amplifiers being connected to said output multidigit data bus;

said second input of each of said write circuits being connected to said write bus;

said third input of each of said write circuits being connected to said read bus;

said second inputs of said first direction read amplifiers being connected to said read bus;

an address decoder of the first matrix column; a multidigit input and an output of said address decoder of the first matrix column;

said multidigit input of said address decoder of the first matrix column being connected to said multidigit address bus of the transistor storage;

the improvement residing in the fact the transistor storage according to the invention comprises:

an address decoder of the second matrix column, intended for addressing the second column of the memory cell matrix; a multidigit input and an output of said address decoder of the second matrix column;

said multidigit input of said address decoder of the second matrix column being connected to said multidigit address bus;

access control circuits for reading information off said memory cells in two directions and combining write and read circuits in one and the same memory cell; a first input, a second input, a third input, a fourth input, a first output and a second output of each of said access control circuits;

said first input of each of said access control circuits being connected to said write bus of the transistor storage;

said second input of each of said access control circuits being connected to said read bus of the transistor storage;

said third input of each of said access control circuits being connected to said output of said address decoder of the first matrix column;

said fourth input of each of said access control circuits being connected to said output of said address decoder of the second matrix column;

said first output of each of said access control circuits being connected to said gate of said first transistor of each of said memory cells of a respective matrix column;

said second output of each of said access control circuits being connected to said gate of said second transistor of each of said memory cells of a respective matrix column;

read amplifiers of a second readout direction;

a first input, a second input and outputs of each of said second direction read amplifiers;

said outputs of said second direction read amplifiers being connected to said output multidigit data bus of the transistor storage;

said first inputs of said second direction read amplifiers being connected to said second data bus;

said second inputs of said second direction read amplifiers being connected to said read bus.

4,488,265

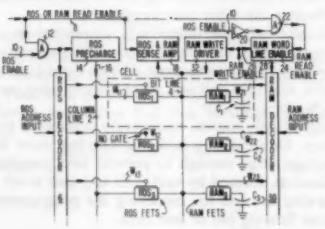
INTEGRATED DYNAMIC RAM AND ROS

Harish N. Kotecha, Manassas, Va., assignor to IBM Corporation, Armonk, N.Y.

Filed Jun. 30, 1982, Ser. No. 393,970

Int. Cl.[3] **G11C** *11/40*

U.S. Cl. 365—189 **25 Claims**



1. A combined read-only storage and read/write random access memory integrated circuit, comprising:

a first FET device having its source/drain path connected between a column line and a bit sensing line and having a selectively programmable gate connected to a first word line, for providing read-only storage for one binary bit by conducting current between said bit sensing line and said column line in response to a signal on said first word line when said selectively programmable gate has a first binary state and by blocking current between said bit sensing line and said column line when said selectively programmable gate has a second binary state;

a second FET device having its source/drain path connected between said bit sensing line and a charge storage element and having a gate connected to a second word line, for providing read/write random access memory for one binary bit by conducting current between said bit

sensing line and said charge storage element in response to a signal on said second word line;

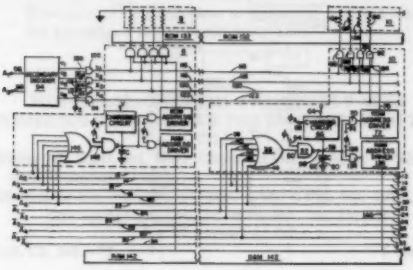
whereby said bit sensing line is shared for both read-only storage and read/write random access memory operations.

4,488,266

LOW-POWER ADDRESS DECODER

John R. Spence, Villa Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sep. 29, 1982, Ser. No. 426,469
Int. Cl.³ G11C *13/00*
U.S. Cl. 365—189 19 Claims



1. A low-power address decoder circuit for providing an address driver signal to retrieve selectively content stored in memory in response to a plurality of input address signals and to first and second timing signals defining successive first, second, and third time intervals, said circuit adapted to operate from a voltage source providing supply and reference voltage levels at supply and reference voltage terminals, respectively, said circuit comprising:

first and second nodes;

a chargeable device connected between said first node and said reference voltage terminal;

means connected to said first node for charging said chargeable device during said first time interval to produce a voltage level on said first node corresponding to a logic high condition substantially equal to said supply voltage level;

a NOR gate having a plurality of address inputs adapted to receive and decode said plurality of input address signals and also having a gated output connected to said first node for maintaining said logic high condition thereon during said second time interval if retrieval is decoded and discharging said chargeable device to produce a voltage level on said first node corresponding to a logic low condition otherwise;

means for gating said NOR gate output to said first node in response to said first timing signal during said second interval;

transmission gate means connected between said first and second nodes for connecting conductively said first and second nodes to each other in response to said first timing signal to establish a unique voltage level on said second node during said second time interval corresponding to said voltage level on said first node;

a bootstrap driver responsive to said unique voltage level on said second node for providing bootstrapped control during said third time interval of said unique voltage level on said second node established during said second time interval; and

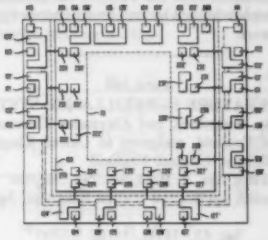
memory cell driver means connected to said second mode and controlled by said bootstrap controlled voltage level thereon for providing an address driver signal to retrieve selectively content stored in memory during said third time interval.

4,488,267

INTEGRATED CIRCUIT CHIPS WITH REMOVABLE DRIVERS AND/OR BUFFERS

Marc L. Harrison, Morganville, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 24, 1982, Ser. No. 381,187
Int. Cl.³ G11C *13/00*
U.S. Cl. 365—201 7 Claims



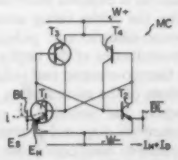
1. An integrated circuit chip comprising at least first and second areas, means for defining a plurality of electrical circuit function blocks in said first area, means for defining a first set of pads and associated first electrical interface circuits in said first area for providing electrical access to said function blocks, means for defining a second set of pads and associate second electrical interface circuits in said second area, electrical conducting paths connected between said first set of pads and associated ones of said second electrical interface circuits in a manner to provide electrical access from associated ones of said second pads to said function blocks.

4,488,268

SEMICONDUCTOR MEMORY

Kazuhiro Toyoda, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan and Fujitsu Limited, Kawasaki, Japan

Filed Sep. 28, 1982, Ser. No. 425,649
Claims priority, application Japan, Sep. 29, 1981, 56/152908; Sep. 30, 1981, 56/155100; Mar. 30, 1982, 57/50108
Int. Cl.³ G11C *13/00*
U.S. Cl. 365—203 15 Claims



1. A semiconductor memory, comprising:

a plurality of word lines;

a plurality of bit lines intersecting said plurality of word lines;

a plurality of memory cells having a selected state and a non-selected state, each comprising load elements, said load elements comprising load transistors and multi-emitter type detection transistors, respectively, operatively connected to said plurality of word lines and said plurality of bit lines at the intersections of said plurality of word lines and said plurality of bit lines, said mult-emitter type detection transistors defining an inverse current gain factor β;

a discharge current source for discharging current from said plurality of memory cells when said plurality of memory cells are changed from a selected state to a nonselected state; and

a bias circuit, operatively connected to said discharge current source, for controlling the discharge current, comprising:

means for controlling the value of the discharge current, in accordance with the value of the inverse β (current gain factor) defined by said multi-emitter type detection transistors.

4,488,269

TEMPERATURE SURVEILLANCE SYSTEMS

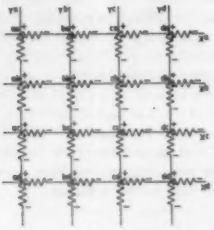
Cyril Robinson, Kuntsford, and Alexander Thomson, Warrington, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

Filed Apr. 9, 1982, Ser. No. 367,064

Claims priority, application United Kingdom, Apr. 16, 1981, 8112045

Int. Cl.³ H01L *35/00, 37/00*

U.S. Cl. 136—213 **3 Claims**



1. A temperature surveillance system for a structure having regions which are susceptible to fault conditions which can cause temperature changes, comprising a plurality of metal sheathed mineral insulated cables in notional lattice array, each cable having a co-axial conductor comprising alternate lengths of dissimilar thermo-electric materials for providing thermo-electric junctions at end abutments of said alternate lengths, alternate junctions being of opposite thermo-electric emf polarities in the sense that opposite emf polarities will be developed at alternate junctions if exposed individually to the same temperature conditions, the cables being arranged so that like junctions of one thermo-electric emf polarity occur at the intersections of the co-ordinates of the lattice array whilst the junctions of opposite thermo-electric emf polarity are disposed between the intersections of the co-ordinates, said junctions of said one thermo-electric emf polarity at said intersections comprising sensing junctions disposed at regions of the structure which are susceptible to fault conditions which can cause a temperature change, and said junctions of opposite thermo-electric emf polarity being located at substantially isothermal regions.

4,488,270

ACOUSTIC IMPEDANCE LOG OBTAINED FROM SEISMOGRAMS

William H. Ruehle, Westport, Conn., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 15, 1981, Ser. No. 302,289

Int. Cl.³ G01V *1/28*

U.S. Cl. 367—73 **4 Claims**

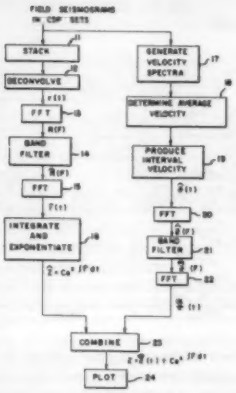
1. In seismic exploration wherein field seismograms represent the reflection of seismic energy received as a function of time at spaced locations along a line of exploration, the method of producing an improved synthetic acoustic log from said seismograms comprising:

deconvovling said field seismograms to form a reflectivity function;

transforming said reflectivity function into a frequency domain representation of reflection amplitudes as a function of reflection frequency;

filtering said frequency domain representation to suppress all freqencies below the seismic pass band whereby a band limited reflection function is formed;

generating from said field seismograms velocity spectra representing the signal power of said reflections as a function of acoustic velocity;



generating from said velocity spectra an acoustic velocity log representing the acoustic velocity of the earth as a function of time;

transforming said acoustic log into a frequency domain representation of amplitude as a function of frequency;

filtering said last named frequency domain representation to suppress all frequencies in the seismic pass band, whereby a band limited velocity function is obtained;

transforming said band limited reflectivity and velocity functions into the time domain; and

combining the time domain representations of said reflectivity and velocity functions to form a synthetic acoustic log.

4,488,271

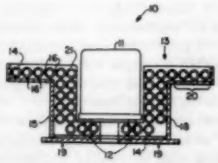
DEEP OCEAN WIDE BAND ACOUSTIC BAFFLE

Jimmy L. Held; Kenneth D. Collins, and Gerald R. Mackelburg, all of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 20, 1983, Ser. No. 505,589

Int. Cl.³ H04R *17/00*

U.S. Cl. 367—151 **11 Claims**



1. An apparatus for blocking and reflecting acoustic energy projected by a transducer comprising:

means nestling the transducer therein providing an array of hollow spherically-shaped elements for blocking and reflecting acoustic energy arranged in a hat-shaped con-

figuration and arranged to at least one-layer thickness of hollow spherically-shaped elements throughout the hat-shaped array;

means coupled to the hollow spherically-shaped elements for resiliently mounting the hollow spherically-shaped elements with respect to each other; and

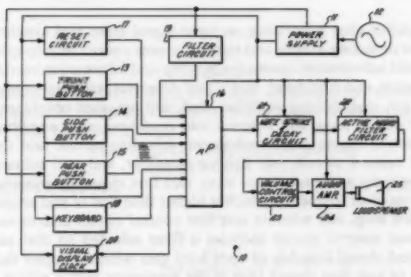
means disposed in contact with the hollow spherically-shaped elements and the resiliently mounting means for maintaining the hat-shaped array configuration and the nestled transducer therein, the transducer is essentially cylindrical in shape and the hollow spherically-shaped elements are arranged in a one-layer thickness where a crown area of the hat-shaped array would be located, a two-layer thickness coaxially from the transducer and a four-layer coaxial, coplanar arrangement where a brim of the hat-shaped array would be located.

4,488,272

MUSICAL DOOR CHIME PREFERABLY ALSO COMBINED WITH A CLOCK FOR ANNUNCIATING THE TIME

Waller M. Scott, Jr., West Chester, Ohio, assignor to Scovill Inc., Waterbury, Conn.

Division of Ser. No. 100,163, Dec. 4, 1979, Pat. No. 4,326,727.
This application Dec. 24, 1981, Ser. No. 334,146
Int. Cl.³ G04B *21/02*
U.S. Cl. 368—75 **6 Claims**



1. A time annunciator comprising:

clock means for indicating the time of day;

a memory for storing a digitally encoded representation of the frequency and the duration of at least one musical note;

a tone generation means connected to said memory and said clock means for converting said digitally encoded musical note representation for said at least one musical note into a squarewave having said frequency and said duration of said at least one musical note; and

circuit means connected to said tone generation means and responsive to said at least one squarewave for playing a sound of said at least one musical note for periodically annunciating the time.

4,488,273

MAGNETIC REPRODUCING APPARATUS CAPABLE OF RECEIVING RADIO BROADCAST PROGRAMS

Yutaka Nokihara, and Hironori Nakajyo, both of Yokohama, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kanagawa, Japan

Continuation of Ser. No. 274,505, Jun. 17, 1981, abandoned.
This application Apr. 20, 1983, Ser. No. 485,138
Claims priority, application Japan, Jul. 15, 1980, 55-96635
Int. Cl.³ G11B *31/00*
U.S. Cl. 369—11 **13 Claims**

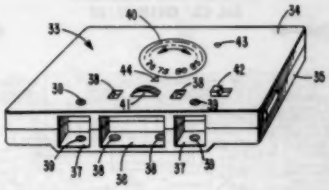
1. A magnetic reproducing apparatus capable of operating in both a magnetic reproducing mode and a radio broadcast receiving mode, said magnetic reproducing apparatus comprising:

a main chassis;

a cassette holding portion on said main chassis for holding a tape cassette;

switch means coupled to said apparatus for operating said apparatus in the reproducing mode and the radio broadcast receiving mode;

a capstan mounted on said main chassis and protruding into said cassette holding portion;



a pinch lever on said apparatus for movement toward said capstan in response to operation of said apparatus when said switch means is set in the reproducing mode;

a pinch roller rotatably mounted on said pinch lever;

a cassette type tuner unit for insertion in said cassette holding portion in the radio broadcast receiving mode; and

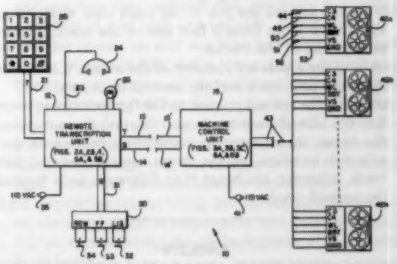
protection means on said chassis for preventing said pinch roller from contacting said capstan when said cassette type tuner unit is inserted in said cassette holding portion.

4,488,274

REMOTE DICTATION TRANSCRIPTION SYSTEM

Luther C. Plunkett, Jr., Atlanta, Ga., assignor to Lanier Business Products, Inc., Atlanta, Ga.

Filed Mar. 4, 1982, Ser. No. 354,600
Int. Cl.³ G11B *21/12, 27/36*
U.S. Cl. 369—24 **18 Claims**



1. In a dictation recorder including means for selectively initiating one of a plurality of recording media motion functions in response to receipt of a particular one of a plurality of distinct start control signals, the improvement comprising:

guard tone signal generator means responsive to each of said start control signals for continuously providing a guard tone signal during the provision of each of said motion functions; and

means responsive to said guard tone signal for continuing a selected one of said plurality of said motion functions only during the presence of said guard tone signal.

4,488,275

TRACKING SYSTEM FOR VIDEO DISC PLAYER

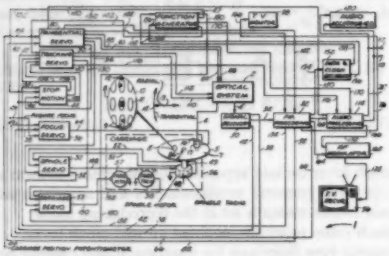
Ludwig Ceshkovsky, Fountain Valley, and Wayne R. Dakin, Redondo Beach, both of Calif., assignors to Discovision Associates, Costa Mesa, Calif.

Division of Ser. No. 298,405, Sep. 1, 1981, Pat. No. 4,439,848, which is a continuation of Ser. No. 131,513, Mar. 18, 1980, abandoned, which is a continuation of Ser. No. 890,670, Mar. 27, 1978, abandoned. This application Dec. 30, 1982, Ser. No. 454,521

The portion of the term of this patent subsequent to May 25, 1999, has been disclaimed.

Int. Cl.³ G11B *21/10*

U.S. Cl. 369—44 6 Claims



1. A method of tracking for use in a player for deriving information from spaced information tracks on an information bearing surface, the player including a source beam of radiation for impinging upon the information bearing surface and following an information track thereon, beam position control means having a first portion responsive to the position of the beam of radiation relative to an information track being followed to produce a tracking error signal and a second portion coupled to the first portion in a closed loop mode and responsive to the tracking error signal for controlling the position of the beam impingement point on the information carrier relative to the information track being followed, the method comprising the steps of:

enabling the beam position control means to change from the closed loop mode to an open loop mode;

uncoupling the second portion from the first portion to establish the open loop mode;

driving the second portion in the open loop mode to move the source beam from a first one of the tracks towards a second one of the tracks;

searching for a selected location of the source beam intermediate the first track and the second track; and

recoupling the second portion to the first portion to re-establish the closed loop mode and control the movement of the beam, in response to completing the search for the selected location, as the beam approaches the second track, whereby the beam then follows a path formed by the second track.

4,488,276

INFORMATION READ APPARATUS WITH TRACKING CONTROL SYSTEM

Shinichi Tanaka, Kyoto, and Namio Hirose, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

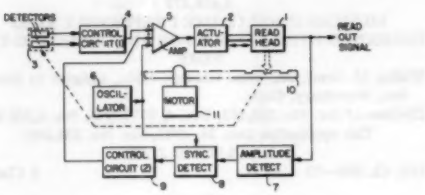
Filed Jan. 15, 1982, Ser. No. 339,509

Claims priority, application Japan, Jan. 16, 1981, 56-5271

Int. Cl.³ H04N *5/76*; G11B *7/00, 21/00*

U.S. Cl. 369—46 5 Claims

1. An information read apparatus comprising: a read head including plural detectors for reading information from an information carrier and for detecting an error of a reading position where information is read on the information carrier; an actuator operatively coupled to said read head for moving said read head or a part of said read head in order to control said reading position; a first control circuit operatively coupled to said plural detectors for amplifying and processing a differential signal from said plural detectors; a driving amplifier operatively coupled to said first control circuit for driving said actuator; an oscillator for generating a wobbling signal which finally wobbles said reading position at a properly selected frequency; an amplitude detecting means operatively coupled to said read head for producing an amplitude signal which is proportional to an amplitude of an output signal from said read head; a synchronous detecting means operatively coupled to said amplitude detecting means for synchronously detecting said amplitude signal with reference to an output signal from said oscillator in order to produce a tracking error signal; a second control circuit operatively coupled to said synchronous detecting means for feeding an output signal to said driving



amplifier after processing an input signal from said synchronous detecting means; and moving means operatively coupled to said information carrier for moving said information carrier, wherein said read head, said plural detectors, said first control circuit, said driving amplifier, and said actuator constitute a first closed loop, and wherein said read head, said amplitude detecting means, said synchronous detecting means, said second control circuit, said driving amplifier, and said actuator constitutes a second closed loop, said first closed loop having a cross-over frequency which is higher than that of said second closed loop, and wherein said first control circuit and/or said second control circuit includes a filter selected so that said second closed loop has an open loop gain which is higher than that of said first closed loop in the frequency region which is lower than W_d, said frequency W_d being a frequency which is lower than the cross-over frequency of said second closed loop.

4,488,277

CONTROL SYSTEM FOR AN OPTICAL DATA RECORDING APPARATUS

Robert McFarlane, New Rochelle, and George C. Kenney, II, Ossining, both of N.Y., assignors to North American Philips Corporation, New York, N.Y.

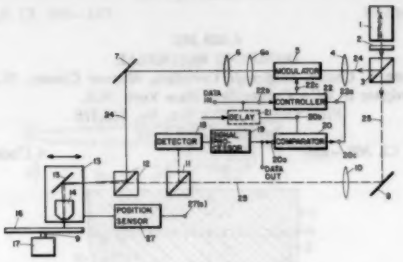
Filed Feb. 10, 1982, Ser. No. 347,608

Int. Cl.³ G11B *7/00, 27/36*

U.S. Cl. 369—48 16 Claims

1. An apparatus for recording data in a form detectable by a read beam of radiation on a recording medium which comprises a radiation sensitive material, said apparatus comprising means for directing a write beam of radiation onto the recording medium, means for producing relative movement between said write beam and said recording medium, means for modulating said write beam in accordance with the data to be recorded so that said write beam records the data on the recording medium by forming thereon a pattern of spaced apart data spots arranged in an elongated track such that when said track is scanned by the read beam, the read beam is modulated by said pattern in accordance with the data stored thereby, means for directing a second beam of radiation onto said track so that said second beam is spaced from and trails said write beam and is modulated by said pattern formed by said write beam, means for deriving from the modulated radiation of said second beam

a first signal representative of the data stored by said pattern, means for comparing said first signal with a second signal representative of the data to be recorded, said comparing means generating an error signal representative of the difference between said first and second signals, and means responsive to said error signal for modifying said second signal in dependence on said error signal, said modulating means being responsive to and modulating said write beam in dependence on said modified second signal so as to ensure that said pattern represents the data to be recorded.

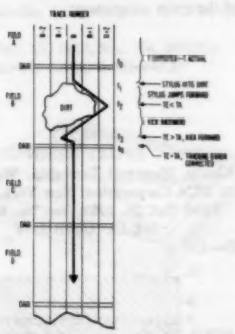


4,488,278

CODING SYSTEM FOR DIGITAL AUDIO DISC RECORD

Charles B. Dieterich, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 17, 1982, Ser. No. 408,785
Int. Cl.³ G11B *21/10*
U.S. Cl. 369—50 **15 Claims**



1. A method for encoding an audio signal in a pseudo-video format to convey track information simultaneously with the audio signal on a line-by-line basis, comprising the steps of:

(a) digitizing said audio signal to form sequential fields of digital data lines;

(b) encoding each data line in an error correction encoder to form an encoded data signal;

(c) generating a track identification number;

(d) initializing said encoder to a given initial condition corresponding to said track identification number prior to encoding each data line; and

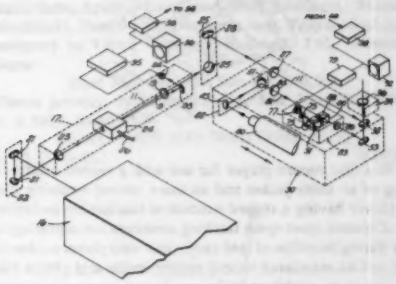
(e) incrementing said track identification number at predetermined intervals related to a multiple of the field rate of said encoded data signal.

4,488,279

VIDEO RECORDER-PLAYBACK MACHINE

Richard L. Wilkinson, and George Vitale, both of Torrance, Calif., assignors to Discovision Associates, Costa Mesa, Calif.

Division of Ser. No. 198,693, Oct. 20, 1980, abandoned. This application May 4, 1983, Ser. No. 491,491
Int. Cl.³ G11B *7/00*
U.S. Cl. 369—54 **3 Claims**



1. A recorder-playback machine for recording and/or playing back information from an information storage disc, comprising:

a machine base;

a "write" laser secured to said machine base, said "write" laser operative to generate a collimated light beam directed along a path for use in recording information upon the disc;

means for supporting the disc for rotation relative to said machine base;

an optical record/playback head mounted in optical alignment with said "write" laser along said path;

means for moving said record/playback head with respect to said machine base and said disc, generally in parallel with a portion of said path and radially of said disc;

modulator means on said machine base along said path for interrupting said light beam to produce a modulated light beam representative of the information, said modulator means including diffraction means for splitting the light beam issuing therefrom into said modulated light beam for passage along said first path, and an auxiliary modulated light beam comprising the complement of said modulated light beam and directed along a second path;

light responsive means along said second path for generating an electrical signal in response to said auxiliary light beam for use in monitoring the characteristics of said modulated light beam;

mens for conditioning said modulated light beam leaving said modulator means for passage along said path through said record/playback head and for focusing said "write" beam on the disc;

a "read" laser mounted with respect to said record/playback head for generating a second light beam directed along a third path for passage of said second light beam through said record/playback head and for focusing thereof by said record/playback head upon the disc for use in playing back information from the disc; and

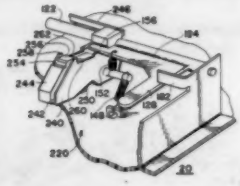
analyzing means for analyzing the electrical signal generated by said light responsive means along said second path.

4,488,280

VIDEO DISC PLAYER HAVING IMPROVED CADDY EXTRACTION MECHANISM

Robert W. Jebens, Skillman, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Sep. 27, 1983, Ser. No. 536,087
Int. Cl.[3] G11B 25/04
U.S. Cl. 369—77.2 8 Claims



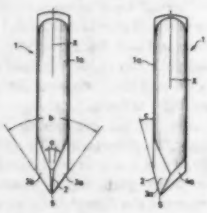
1. In a disc record player for use with a record caddy consisting of an outer jacket and an inner record retaining spine; said player having a record extraction mechanism including a pair of spaced apart spine latching members for capturing said spine during insertion of said caddy into said player so that said spine and an associated record remain inside said player when said jacket is withdrawn; improvement comprising means cooperating with one of said spine latching members for preventing said one spine latching member from capturing said spine until the other spine latching member is ready to capture said spine.

4,488,281

CAPACITANCE DETECTION TYPE RECORD STYLUS HAVING A CONDUCTIVE SHANK

Hideaki Takehara, Fujisawa; Yoshiyo Wada; Kunio Goto, both of Yokohama, and Keiji Segawa, Sagamihara, all of Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan

Filed Mar. 12, 1982, Ser. No. 357,354
Claims priority, application Japan, Mar. 13, 1981, 56-36953
Int. Cl.[3] G11B 9/00
U.S. Cl. 369—126 7 Claims



1. A record stylus for detecting, as capacitance variations, signals recorded on a disk record in the form of minute pits along tracks, comprising:

a conductive shank, the shank having a surface,

a diamond partially embedded in said shank so that the diamond projects downwardly from one end of the shank, said diamond being formed with a bottom face for making slidable contact with said disk record,

said shank and diamond being formed with a pair of rear faces inclined with respect to an axis of said stylus to define an electrode forming face therebetween,

said electrode forming face extending from said bottom face partially into the surface of said shank,

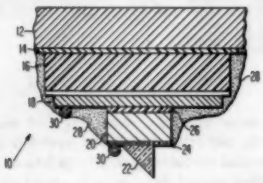
a conductive layer forming an electrode coated over the entire area of said electrode forming face to establish electrical connection with said shank to allow the latter to act as a passage for signals detected by the electrode.

4,488,282

DAMPING MATERIAL

Kwong T. Chung, Hopewell Township, Mercer County, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 26, 1983, Ser. No. 545,735
Int. Cl.[3] G11B 3/44
U.S. Cl. 369—135 6 Claims



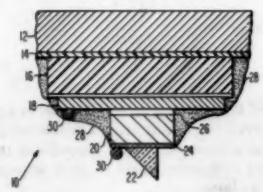
1. In a cutterhead assembly comprising a cutting stylus adhered to a piezoelectric element surrounded with a damping material attached to a pedestal and an electrically insulating support, the improvement which comprises using as the damping material a material which is a cured epoxy composition derived from a resin component and a hardener component, wherein the resin component contains a high molecular weight diglycidyl ether of bisphenol A and a diglycidyl ether of a long chain dimer acid and the hardening component comprises a polyamide-amine curing agent and an accelerator and wherein the percent by weight of the hardener component is higher than that of the resin component.

4,488,283

EPOXY RESIN

Kwong T. Chung, Hopewell Township, Mercer County, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 26, 1983, Ser. No. 545,736
Int. Cl.[3] G11B 3/44
U.S. Cl. 369—135 5 Claims



1. In a cutterhead assembly comprising a diamond stylus bonded to a piezoelectric element, a pedestal and a mounting support, the improvement which comprises utilizing as a bonding material to bond the stylus to the piezoelectric element, a cured epoxy composition derived from tetraglycidated methylene dianiline cured with a methylated maleic acid adduct of phthalic anhydride.

4,488,284

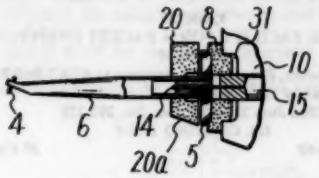
MOVING-COIL TYPE PICKUP CARTRIDGE

Naohisa Aoki, and Akira Matuki, both of Mitaka, Japan, assignors to Nippon Columbia Co., Ltd., Tokyo, Japan

Division of Ser. No. 240,227, Mar. 3, 1981, abandoned. This application Sep. 30, 1982, Ser. No. 430,716

Int. Cl.³ H04R 9/16

U.S. Cl. 369—147 15 Claims



1. A moving-coil type pickup cartridge comprising: a vibrating system including a cantilever having a stylus fixed thereto at one end and a coil-wound armature fixed thereto at its other end; a suspension holder comprising a magnet a suspension wire, fixed at one end to said cantilever and at the other end to said suspension holder; said magnet maintaining a flux path originating at one end thereof and passing about the exterior of said magnet to the other end thereof, said vibrating system being disposed at said one end of said magnet and having said armature disposed within said flux path, a first damper interposed between said armature and said magnet within said flux path and a second damper associated with said vibrating system disposed in said flux path on said cantilever between said armature and said stylus free of contact with any part other than of said vibrating system.

4,488,285

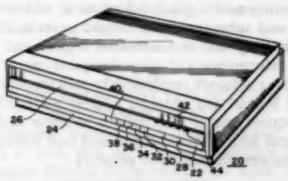
STYLUS LIFTER LOCKING MECHANISM FOR VIDEO DISC PLAYER

Eric A. Brauer, Danville, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 13, 1982, Ser. No. 449,314

Int. Cl.³ G11B 3/02, 17/00

U.S. Cl. 369—170 3 Claims



1. In a record player including a pickup stylus subject to engagement with a turntable-supported record during playback; said stylus being mounted at one end of a stylus arm having its other end yieldably supported in a translatable carriage which is subject to lateral motion toward and away from an off-record rest position; said player further having a selectively-activated means mounted in said carriage for lifting and lowering said stylus arm in a manner causing said stylus to protrude from said carriage to effect engagement and disengagement of said stylus with a turntable-disposed record; said stylus lifting/lowering means including a stylus arm bracket mounted for motion between a raised position and a lowered position; an apparatus comprising:

sensing element mounted to said carriage for motion between a first position and a second position in response to the disposition of said carriage away from said rest position and at said rest position respectively; said element being biased to occupy said first position; one end of said element engaging a portion of said player as said carriage is driven toward said rest position to displace said element to said second position thereof; the other end of said element engaging said stylus arm bracket to hold it in place when said element is deflected to said second position.

4,488,286

SIGNAL-PICKUP CARTRIDGE FOR A ROTARY RECORDING MEDIUM REPRODUCING APPARATUS

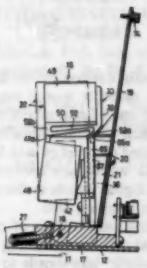
Takashi Saito, Ayase; Masayoshi Uchida, Yokohama; Masafumi Mochizuki, Yamato, and Norimasa Arai, Tokyo, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed May 28, 1982, Ser. No. 383,244

Claims priority, application Japan, Jun. 2, 1981, 56-84717; Jun. 2, 1981, 56-84718

Int. Cl.³ G11B 3/10; B65D 81/02, 85/30

U.S. Cl. 369—292 14 Claims



1. A signal-pickup cartridge adapted to be loaded into a holder of a signal-pickup device proper of a rotary recording medium reproducing apparatus, said signal-pickup cartridge comprising:

a cantilever having at its distal tip a reproducing element for picking up and reproducing a signal from a rotary recording medium rotating in said apparatus;

a cartridge case supporting therewithin the cantilever and having a ceiling plate and vertical walls on opposite sides thereof;

a box-shaped cover joinable to the cartridge case to cover the lower face thereof, said cover including a solid bottom plate which covers the cartridge case in entirety from below and encloses the cantilever within said reproducing element at the distal tip to protect the cantilever and the reproducing element; and

means for joining the cover and the case in a latched state so as to prevent the cover from being removed manually, said means being triggered to unlatch the cover from the case so as to permit removal of the cover upon loading of the cartridge into said holder.

4,488,287

COMBINING AND SPLITTING OF VOICE AND DATA FROM MULTIPLE TERMINAL SOURCES AND ELECTRONIC PABX FOR SAME

Nicholas J. R. Carter, Shelton; Francisco A. Middleton, Sandy Hook, and Santanu Das, Shelton, all of Conn., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Nov. 30, 1982, Ser. No. 445,626

Int. Cl.³ H04Q 11/04

U.S. Cl. 370—58 38 Claims

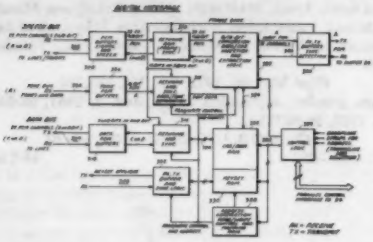
1. A circuit for combining and splitting speech and data for

transmission through a digital switching network between two or more terminal sources, comprising:

means for receiving and retiming frames of digitally encoded multibit words in a plurality of channels from said terminal sources, some of which bits of said multibit words comprise a digital speech sample;

means for receiving and retiming frames of N bit data words in a plurality of channels from said terminal sources;

means for deriving two or more nibble data words from each of said N bit data words, each of said nibble data words having less than N bits of said N bit data word therein;



means for inserting said desired nibble data words into said digitally encoded multibit words such that said digital speech sample and one of said nibble data words are each inserted within each of said digitally encoded multibit words in a designated channel of said frame, and the other of said nibble data words are inserted in the following frames in multibit digital words in the same channel as the next digital speech samples; and

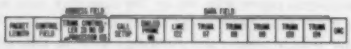
means for transmitting said frames of channels containing said multibit digital words containing said digital speech samples and said nibble data words to said digital switching network.

4,488,288

END-TO-END INFORMATION MEMORY ARRANGEMENT IN A LINE CONTROLLER

Jonathan S. Turner, Evanston, Ill., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 25, 1982, Ser. No. 392,227
Int. Cl.³ H04J *6/00*
U.S. Cl. 370—60 **43 Claims**



1. In a packet communication system for switching packets of digital signals with each of said packets having an address field defining a communication path through said system and a data field and said system comprising:

a plurality of terminals;

the invention comprising:

processor means;

packet switching network means operable for establishing path connections for a call setup packet from a first one of said terminals to said processor means in response to the address field of said call setup packet;

said processor means responsive to a receipt of said call setup packet for supplying address information in the data field of said call setup packet to effect an operation of said network means for the establishment of path connections communicating from said first one of said terminals to a second one of said terminals and to communicate said call setup packet to said second one of said terminals;

route address means for said first and second ones of said terminals for effecting the storage of said address information following a receipt of said call setup packet at said second terminal; and

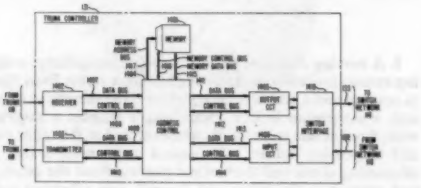
said packet switching network being subsequently operable independent of said processor means under control of said stored address information inserted into subsequent ones of said plurality of packets for establishing path connections between said first and second terminals to communicate said subsequent packet therebetween.

4,488,289

INTERFACE FACILITY FOR A PACKET SWITCHING SYSTEM

Jonathan S. Turner, Evanston, Ill., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 25, 1982, Ser. No. 392,228
Int. Cl.³ H04Q *11/04*
U.S. Cl. 370—60 **37 Claims**



1. A packet switching system for communicating a plurality of messages each comprising a plurality of packets, and each packet comprising a logical address, said system comprises:

transmission means for communicating a one of said messages;

a central processor responsive to destination information of a first packet of said one of said messages to generate logical and physical address information;

memory means associated with said transmission means responsive to the generated logical and physical address information to store said generated information;

controller means associated with said transmission means comprising means responsive to a subsequent one of said packets of said one of said messages to read the stored logical and physical address information, means for concatenating said logical and physical address information with said subsequent one of said packets, and means for transmitting said concatenated logical and physical address information and said subsequent one of said packets;

a switching network responsive to said transmitted concatenated logical and physical address information and said subsequent one of said packets to route said logical and physical address information and said subsequent one of said packets through said network.

4,488,290

DISTRIBUTED DIGITAL EXCHANGE WITH IMPROVED SWITCHING SYSTEM AND INPUT PROCESSOR

James E. Dunn, San Diego; Colin Bradbury, La Jolla; Kenneth R. Holmes, La Jolla, and Stephen W. Treadwell, La Jolla, all of Calif., assignors to M/A-Com Linkabit, Inc., San Diego, Calif.

Filed Aug. 4, 1982, Ser. No. 405,103
Int. Cl.³ H04Q *11/04*
U.S. Cl. 370—66 **14 Claims**

1. A switching system for routing data from any selected data bit position in a frame of a time-division-multiplexed input signal to one or more selected data bit positions in a frame of a time-division-multiplexed output signal, comprising

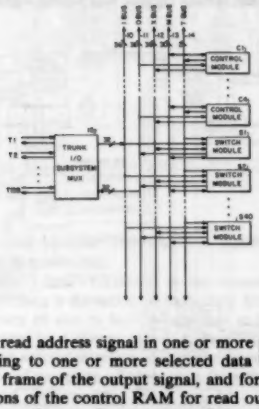
a data RAM for storing the input signal during write intervals defined by a timing signal;

address selection means for selecting write address signals

for addressing positions in the data RAM for storing data from each data bit position in every frame of the input signal and for providing said selected write address signals to address the data RAM during the write intervals, and for selecting a designated read address signal for addressing a selected position in the data RAM corresponding to a selected data bit position in every frame of the input signal, and for providing said designated read address signal to address the data RAM during a read interval defined by the timing signal to thereby read data from the data RAM;

a control RAM for storing the designated read address signal;

means for addressing the control RAM for storing the designated read address signal in one or more positions corresponding to one or more selected data bit positions in every frame of the output signal, and for addressing the positions of the control RAM for read out in a sequence corresponding to the sequence of data bit positions in every frame of the output signal;



means for coupling the control RAM to the address selection means for providing the designated read address signal to the address selection means for causing data to be read from the data RAM during intervals corresponding to the one or more selected data bit positions in every frame of the output signal; and

a read latch for latching the data read from the data RAM into the one or more selected data bit positions in every frame of the output signal.

4,488,291

CIRCUIT ARRANGEMENT FOR SETTING UP A CONFERENCE CALL

Joachim Eschmann, Korntal, and Jürgen Zanzig, Weil-der-Stadt, both of Fed. Rep. of Germany, assignors to International Standard Electric Corporation, New York, N.Y.

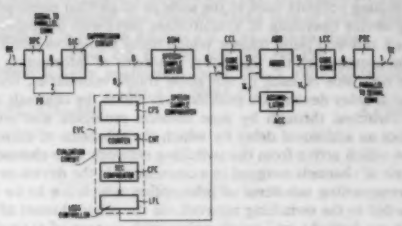
Filed Nov. 30, 1982, Ser. No. 445,629

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1981, 3148886

Int. Cl.³ H04M *3/56*; H04Q *11/04*

U.S. Cl. 370—62 **5 Claims**

1. Circuit arrangement for setting up a conference call in a digital telephone switching system, comprising a first code converter converting the nonlinearly coded speech samples originating from the individual participants into linearly coded values, an adder summing the converted values, and a second code converter converting the sum values into nonlinearly coded speech samples, wherein the incoming speech samples are compared in an evaluation circuit and evaluated there over an integration time in such a way that the participant with the highest speech-signal intensity is determined, and that the speech samples of this participant are fed to the adder unattenuated, while the speech samples of the other participants are fed to the adder after being attenuated by a predetermined value; and wherein the evaluation circuit contains a first comparator comparing the speech samples, and a counter for each of the participants, and that on the basis of the result of the



comparison, the counter assigned to the loudest participant is increased by one count, while the counters assigned to the remaining participants are decreased by one count.

4,488,292

PCM-TDM SWITCHING SYSTEM USING TIME SLOT MULTIPLES

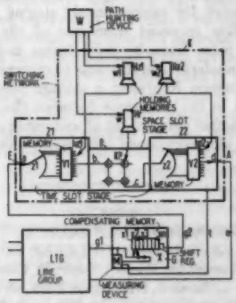
Marcel A. Troost, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Dec. 9, 1981, Ser. No. 328,954

Claims priority, application Fed. Rep. of Germany, Feb. 5, 1981, 3104002

Int. Cl.³ H04J *3/00*

U.S. Cl. 370—63 **3 Claims**



1. In a circuit arrangement for time division multiplex telecommunications exchanges, in particular pulse code modulation telephone exchanges, in which individual connections are each established via a pair of channels, the two individual channels of which serve to transit items of communication relating to the connection in the one transmission direction and in the other transmission direction, and in which line devices are individually connected to the inputs of a multi-stage switching network which includes an incoming time slot stage, an outgoing time slot stage and a space slot stage connected between said time slot stages, and in which the two channels which are to be switched through via the switching network in accordance with the time division multiplex principle and which are each assigned to a connection exhibit synchronism in respect of clock rate and pulse frame boundaries by virtue of intermediate storage of the items of communication information to be transmitted in each of the two directions of transmission, in which the write-in and read-out processes in the full memories of each of these devices are brought into synchronism in respect of the time sequence of the individual sub-items of information and the time of the pulse frame boundaries of the pulse frames which combine the sub-items of information scanning cycle-by-scanning cycle, and in which the two chan-

nels which are switched through by time division multiplex and are each assigned to a connection are subject to delay influences in their course from one of the devices via the switching network back to the same or to another corresponding device operating in synchronism therewith in respect of clock rate and pulse frames, which delay influences affect the time sequence of the individual sub-items of information and the time slot of each of the pulse frame boundaries, and in which delay devices are provided via which the channels may be switched through by time division multiplex and which effect an additional delay by which the sub-items of information which arrive from the switching network via a channel of a pair of channels assigned to a connection in the device or the corresponding sub-items of information which are to be forwarded to the switching network via the other channel of the pair are brought into synchronism with respect of their time slots and the boundaries of their pulse frames in order to assure the above-mentioned synchronism, the improvement therein comprising:

means in said time slot stages in the last switching stage operable to transmit the received sub-items of information which have been intermediately stored in the respective full memory in pulse frames whose boundaries are displaced in respect of time slots relative to the pulse frame boundaries of the pulse frames of the sub-items of information received in the time slot stage by a delay time whose duration is determined by the difference between the pulse frame duration and the sum of possible maximum values of those delays which are caused by line influences on the path from the switching network output to the device in question and on the path from this device to the relevant switching network input, and by influences, in particular interference influences, within this device; and

compensating memories assigned to the inputs of the switching network for intermediately storing the sub-items of information received from one of the aforementioned devices pulse frame-by-pulse frame including the pulse frame boundaries and operable to retransmit the sub-items of information following a storage time which may be matched to the difference between the maximum value and the actual value of the aforementioned line influences and the aforementioned influences within the device in question.

4,488,293

ASYNCHRONOUS DIGITAL TDM MULTIPLEXER-DEMULTIPLEXER COMBINATION

Robert H. Haussmann, Wayne; Stuart B. Cohen, Cedar Grove, and Arthur L. Bandini, Harrington Park, all of N.J., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

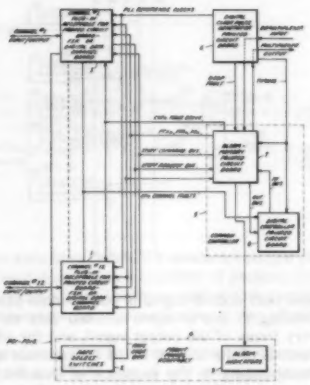
Filed Dec. 23, 1981, Ser. No. 334,006
Int. Cl.³ H04J *3/00*
U.S. Cl. 370—84 **29 Claims**

1. An asynchronous digital time division multiplexer-demultiplexer combination at one communication terminal to multiplex N asynchronous input data signals having a random mixture of different bit rates into a transmitted synchronous data stream having a predetermined fixed data format and a given bit rate greater than the sum of the rates of said different rates and to demultiplex N asynchronous output data signals having said random mixture of said different bit rates from a received synchronous data stream having said data formal and said given bit rate, where N is an integer greater than one, comprising:

N channel printed circuit board plug-in receptacles each coupled to a different one of said N input data signals and a different one of N outputs each for a different one of said N output signals, each of said N receptacles having plugged therein a selected one of no printed circuit boards, a digital data channel printed circuit board and a frequency shift keying (FSK) channel printed circuit board to process a mixture of digital data signals, teletype signals and FSK signals in said N input data signals and said received data stream, said mixture of signals being in a random order and mix and no printed circuit boards, said digital channel printed circuit boards and said FSK channel printed circuit boards being plugged in said N receptacles in any random order and mix;

first means coupled to each of said N receptacles to provide a plurality of reference clock signals therefore and coupling each of said N receptacles in common to second means for transmitting said transmitted data stream and in common to a third means for receiving said received data stream; and

fourth means coupled to said first means and each of said N receptacles to provide at least multiplexing and demultiplexing control signals, frame synchronization and channel assignment timing signals, said timing signals control-



ling distribution of data bits of each of said N input data signals with optimally even spacing throughout time slots of said transmitted data stream and controlling extraction of data bits of each of said N output data signals from said received data stream, said bits of each of said N output signals being distributed with equal spacing throughout time slots of said received data stream, said distribution of said bits of each of said N input data signals and each of said N output data signals being in agreement with its associated bit rate, said timing signals providing said even distribution of data bits in said transmitted data streams and extracting said equally spaced bits of each of said N output data signals from said received data streams even when certain ones of said N receptacles have no printed circuit board plugged therein.

4,488,294

ESTABLISHING AND SUPPORTING DATA TRAFFIC IN PRIVATE BRANCH EXCHANGES

Tore L. Christensen; Gail L. Haygood; Douglas A. Spencer, and Steven J. Szymanski, all of Boulder, Colo., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 30, 1982, Ser. No. 363,424
Int. Cl.³ H04J *3/02*
U.S. Cl. 370—84 **9 Claims**

1. Apparatus for effecting digital character communications between first and second end units (DTE-1, DTE-2) operable in asynchronous character transmission modes, said apparatus comprising

a first interface unit (DI-1) for local connection to said first end unit,

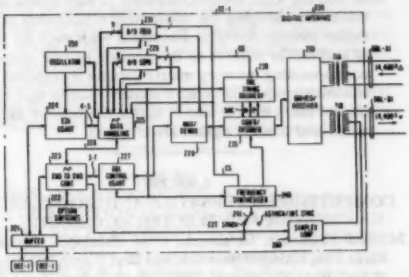
a second interface unit (DI-2) for local connection to said second end unit,

data transmission means (DDL-B1 DP-1, 201S-1, DP-2,

DDL-B2) interconnecting the first and second interface units,

a first clock (DI-1:250) in the first interface unit arranged to operate at a prescribed nominal frequency for controlling the rate of transmission of characters received from the first end unit to the second interface unit via the data transmission means,

a second independent clock (DI-2:250) in the second interface unit also arranged to operate at said prescribed nominal frequency for controlling the rate of transmissions of



characters received from the first interface unit to the second end unit, and

means (POLL2, OVERRUN) in the second interface unit for detecting a deviation in frequency from the nominal frequency of one or both of the first and second clocks manifested by a slower rate of transmission of characters from the second interface unit to the second end unit than the rate of reception of characters from the first interface unit, and including,

means responsive to the detecting means for temporarily increasing the rate of operation of the second clock.

4,488,295

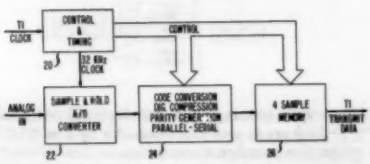
ALARM IMMUNE PROGRAM SIGNAL

Craig A. Sharper, Haverhill, Mass., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 31, 1982, Ser. No. 413,421

Int. Cl.³ H04J *15/00*

U.S. Cl. 370—99 **2 Claims**



1. An arrangement for transmitting a broadband signal over a multiplexed pulse code modulated (PCM) transmission system having 8-bit time slots comprising:

encoding means for transforming said broadband signal into PCM words of n-bits each,

inserting means for inserting m of said n-bit words into p of said 8-bit time slots wherein m, n and p are integers and $mn=8p$

characterized in that

said arrangement further comprises bit order arranging means for arranging the bit order of said n-bit words so that the second bit positions of said p 8-bit time slots are occupied only by the p least significant bits of said n-bit words.

4,488,296

TIME DIVISION MULTIPLE ACCESS SYSTEM FOR TRANSMITTING AN ANALOG SIGNAL BY THE USE OF BURSTS WITHOUT SUBSTANTIAL INTERRUPTION

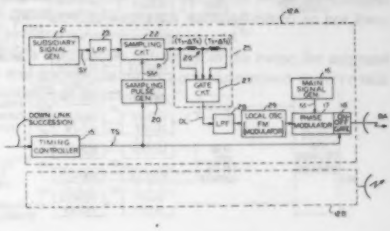
Kazuhiro Yamamoto, and Masaaki Atobe, both of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Jul. 6, 1982, Ser. No. 395,113

Claims priority, application Japan, Jul. 7, 1981, 56-105108

Int. Cl.³ H04J *3/12*

U.S. Cl. 370—104 **5 Claims**



1. A time division multiple access system comprising a central station and N substations where N represents a natural number greater than one, said central station including means for transmitting a down-link succession of down-link continuous signals with N successive down-link signals being transmitted in each of a plurality of successive time frame periods of a common duration, the down-link transmission being to the respective substations, means at each of said substations for accessing said central station by N main and subsidiary signal combinations, respectively, said main and subsidiary signal combinations being received at said central station in a succession of time slot intervals, said time slot intervals being divisible into N internal interval sequences which are assigned to the respective substations with N successive ones of said time slot intervals arranged in each of said frame periods and with the intervals of one of said internal interval sequences followed by the respective intervals of another of said internal interval sequences, wherein each of said substations further comprises:

timing pulse producing means responsive to said down-link succession for producing a sequence of timing pulses for defining the respective time positions of a particular one of said internal interval sequences that is assigned to each of said substations;

sampling pulse producing means responsive to said timing pulse sequence for producing a succession of sampling pulses with at least one sampling pulse produced within each of said time frame periods;

sampling means responsive to said sampling pulse succession for sampling a particular one of the subsidiary signals of said combinations that is to be transmitted from each of said substations, said sampling means producing a succession of sampled pulses with at least one sampled pulse produced in each of said frame periods, said sampled pulse sequence being representative of said particular subsidiary signal;

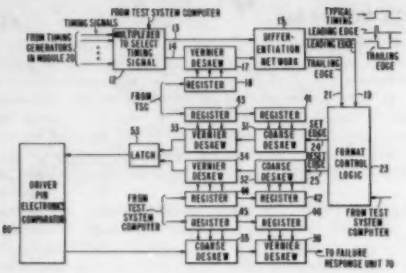
signal pulse time locating means responsive to said sampled pulse succession for locating at least one signal pulse in each time slot interval of said particular internal interval sequence by deriving the at least one sampled pulse from said sampled pulse succession to produce a sequence of signal pulses arranged in said particular internal interval sequence; and

transmitting means responsive to a particular one of the main signals of said combinations that is to be transmitted from each of said substations and to said signal pulse sequence for transmitting a sequence of up-link bursts from said substation to said central station in the respective intervals of said particular internal interval sequence, said up-link burst sequence being representative of said particular main signal and said signal pulse sequence.

4,488,297
PROGRAMMABLE DESKEWING OF AUTOMATIC TEST EQUIPMENT

Hoshang Vaid, San Jose, Calif., assignor to Fairchild Camera and Instrument Corp., San Jose, Calif.

Filed Apr. 5, 1982, Ser. No. 365,829
Int. Cl.³ H03K *3/86*
U.S. Cl. 371—1 **17 Claims**



1. Apparatus for delaying an electrical signal present at a selected node comprising:

first multiplexing means for connecting one of a plurality n of input terminals of the first multiplexing means to an output terminal;

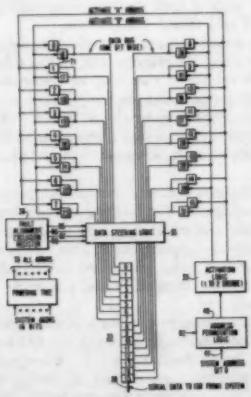
a plurality of adjustable length delay lines, each coupled between a different pair of input terminals to thereby cause the electrical signal to be supplied to each input terminal after a first input terminal after passing through at least one delay line; and

means for supplying the signal to be delayed to the first input terminal.

4,488,298
MULTI-BIT ERROR SCATTERING ARRANGEMENT TO PROVIDE FAULT TOLERANT SEMICONDUCTOR STATIC MEMORIES

George L. Bond, Fishkill; Frank P. Cartman, Poughquag, and Philip M. Ryan, Hopewell Junction, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 16, 1982, Ser. No. 388,834
Int. Cl.³ G06F *11/10*
U.S. Cl. 371—11 **6 Claims**



1. A memory system comprising in combination:

a number of memory chips arranged in a matrix of N rows and M columns, each said chip having K×L individually addressable bit positions;

K×L×N memory addresses, each of which comprises M bit positions;

a buffer for storing N words each comprising M bit positions;

means for connecting the write input and the read output of each said chip in each said column of said memory matrix to one of N buffer storage positions associated with each one of said memory columns;

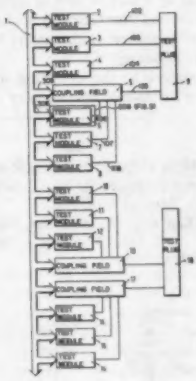
a source of changeable control signals; and

data steering logic means connected to said source and said buffer for changing the connective relationship of said N buffer storage positions associated with each bit position of said buffer relative to the position of said chips in the corresponding memory matrix column in response to said control signals, said control signals causing said relationship of said chips to said N buffer positions to be altered when said control signals are changed.

4,488,299
COMPUTERIZED VERSATILE AND MODULAR TEST SYSTEM FOR ELECTRICAL CIRCUITS

Michael Fellhauer, Geislingen; Otto Holzinger, Eschenbach; Klaus Vits, Uhingen-Baiereck, and Bert Wurst, Möglingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Apr. 13, 1982, Ser. No. 367,915
Claims priority, application Fed. Rep. of Germany, Apr. 23, 1981, 3116079
Int. Cl.³ G06F *11/00*
U.S. Cl. 371—20 **9 Claims**



1. A versatile testing system for electrical components and circuits which are in each case accessible by a multiple-contact test connection member, comprising:

at least one multiple-contact test plug capable of mating said multiple-contact connection members of said components and circuits to be tested;

a two-way data and address bus having a plurality of data and address ports, said ports having connection places for plug-in connection,

a microcomputer equipped with a microprocessor, a memory, a keyboard for making test selections and orders and a display unit said microcomputer being connected to said bus and constituted for selectively addressing the several ports of said bus for producing tests and registering the results thereof on said display in response to orders entered from said keyboard, for presenting on said display available options for further orders for completion of a selected test, for indicating an aborted test in response to an order from said keyboard not within said available

options, and for addressing all ports of said bus in quick succession in order to display whether test modules are connected to the several ports and if so which modules are so connected;

a set of test modules selectively connectable at connection places to said ports, each of which modules is provided with a coding circuit addressable through a said port of said bus into which it is connectable, for supplying a data word to said microcomputer identifying the nature of the test module, its presence at the said port and its ready-or-not condition, and

connection means at ports of said bus for connecting said at least one test plug directly or indirectly to places at said ports where a plurality of said test modules are respectively connectable.

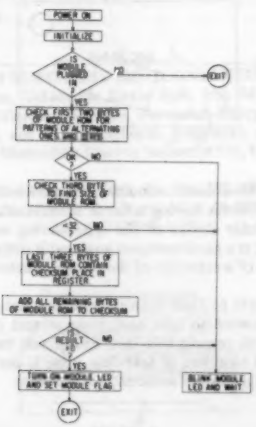
said microcomputer being also constituted to scan said ports of said bus and to display an indication of test modules connected thereto and of the state of said modules.

4,488,300

METHOD OF CHECKING THE INTEGRITY OF A SOURCE OF ADDITIONAL MEMORY FOR USE IN AN ELECTRONICALLY CONTROLLED SEWING MACHINE

Leonard I. Horey, West Orange, and Marvin Kurland, East Brunswick, both of N.J., assignors to The Singer Company, Stamford, Conn.

Filed Dec. 1, 1982, Ser. No. 445,814
Int. Cl.³ G06F *11/10*
U.S. Cl. 371—21 **6 Claims**



1. In an electronically controlled sewing machine having an internal central processor unit for controlling the operation of the sewing machine and means for coupling an external module containing additional read only memory to said central processor unit, a predetermined pattern of data being stored both in said central processor unit and at a first predetermined location in said additional memory, and said additional memory having stored therein at a second predetermined location checksum data which has a predetermined relationship to the sum of all the data in said additional memory outside said second predetermined location, a method of checking the integrity of said additional memory and said coupling means, said method comprising the steps of:

transmitting the contents of said first predetermined location to said central processor unit;

comparing in said central processor unit the transmitted data with said predetermined pattern of data stored in said central processor unit;

providing a first fault indication in the event the comparing step reveals that the transmitted data and the predetermined pattern of data are not equal;

summing in said central processor unit all the data in said additional memory outside said second predetermined location in the event the transmitted data and the predetermined pattern of data are equal;

determining in said central processor unit whether the summed data has said predetermined relationship to the checksum data;

providing a second fault indication in the event the summed data and the checksum data are determined to not have said predetermined relationship; and

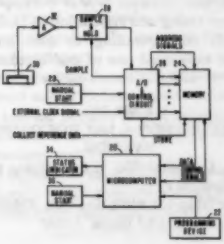
providing a verification indication in the event the summed data and the checksum data are determined to have said predetermined relationship.

4,488,301

SYSTEM FOR ANALYZING COMPLEX SIGNALS

Anthony T. Nasuta; Robert A. Boenning, both of Timonium, Md., and Mark G. Kraus, Pittsburgh, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 1, 1982, Ser. No. 383,447
Int. Cl.³ G08B *21/00*
U.S. Cl. 371—25 **8 Claims**



2. A test system comprising:

(a) apparatus selectably coupled to a reference circuit of the type whose operational status is to be determined to generate an output signal indicative of the operational status of said reference circuit;

(b) apparatus for periodically sampling said output signal to generate a reference data base, said reference data base being indicative of a predetermined operational status of said reference circuit;

(c) apparatus for processing said reference data base to generate a reference transform;

(d) apparatus selectably coupled to a circuit whose operational status is to be determined to generate an output signal indicative of the operational status of said circuit whose operational status is to be determined;

(e) apparatus for periodically sampling said output signal indicative of the operational status of said circuit whose operational status is to be determined to generate a comparison data base;

(f) apparatus for processing said comparison data base to generate a comparison transform;

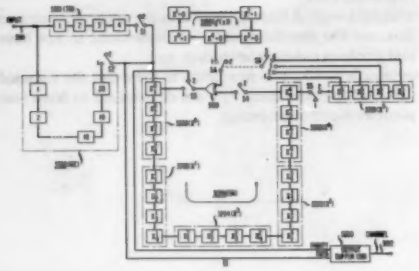
(g) apparatus for processing said reference transform and said comparison transform to determine the operational status of said circuit whose operational status is to be determined.

4,488,302

BURST ERROR CORRECTION USING CYCLIC BLOCK CODES

Syed V. Ahamed, Gillette, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 11, 1983, Ser. No. 465,790
Int. Cl.³ G06F *11/10*
U.S. Cl. 371—40 **11 Claims**



1. A method for encoding a series of data bits comprising the steps of

forming contiguous blocks of interleaved data words, each of said words comprising unique ones of said bits separated by a predetermined number of said bits, each of said blocks comprising a preselected number of said data words, and

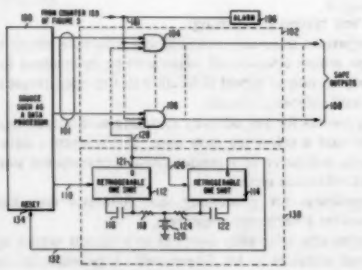
producing encoded channel words corresponding to said blocks by generating and appending to each of said blocks parity words corresponding to said interleaved data words in the associated one of said blocks.

4,488,303

FAIL-SAFE CIRCUIT FOR A MICROCOMPUTER BASED SYSTEM

Abe Abramovich, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 17, 1982, Ser. No. 379,096
Int. Cl.³ H03K *17/00*
U.S. Cl. 371—62 **9 Claims**



1. A fail-safe protection circuit for a data processing controlled system having stored programs, a plurality of data output terminals, and a first output terminal and comprising:

means for checking the execution of its programs at periodic intervals not greater than T_1 to produce an output trigger pulse on said first output terminal at said periodic intervals if said program execution is correct up to that time, and comprising:

a first retriggerable two-state one-shot device responsive to said output pulses to become triggered to its first state and having a time delay T_2 before it changes from its triggered first state to its second state, where $T_2 > T_1$;

a plurality of gating means each having a first input terminal connected to an individual one of said data output terminals, a second input terminal coupled to the said first retriggerable two-state, one-shot device, and a second output terminal; and

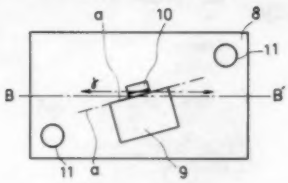
said gating means responsive to the first state of said first retriggerable, two-state, one-shot device to become primed to pass therethough the data supplied to said first input terminal and responsive to the second state of said first retriggerable, two-state, one-shot device to inhibit the passage therethrough of the data supplied to said first input terminal thereof.

4,488,304

STEM FOR SEMICONDUCTOR LASER DEVICES

Hirokazu Shimizu, Toyonaka; Kunio Itoh, Uji; Masaru Wada; Takashi Sugino, both of Takatsuki, and Takako Okabe, Kusatsu, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation of Ser. No. 299,538, Sep. 4, 1981, abandoned. This application Feb. 29, 1984, Ser. No. 583,784
Claims priority, application Japan, Sep. 9, 1980, 55-124843
Int. Cl.³ H01S *3/04*
U.S. Cl. 372—36 **2 Claims**



1. A stem for a semiconductor laser device comprising:

a heat sink block having a flat face for bonding a semiconductor laser device of the type having an active layer oriented at a predetermined angle with respect to a principal face of a substrate of the semiconductor laser device, and

a base plate to be fixed to an external heat sink, said heat sink block bonded to said base plate at said predetermined angle with respect to a base line of said base plate, such that said base line of said base plate is parallel with the active layer of the semiconductor device.

4,488,305

PROTECTION DEVICE FOR A LASER DIODE

Claude Claverie, and Jean-Yves Eouzan, both of Paris, France, assignors to Thomson-CSF, Paris, France

Continuation of Ser. No. 328,270, Dec. 7, 1981,. This application Mar. 21, 1984, Ser. No. 591,250
Claims priority, application France, Dec. 9, 1980, 80 26074
Int. Cl.³ H01S *3/19, 3/096*
U.S. Cl. 372—38 **6 Claims**

1. A protection device for a laser diode comprising:

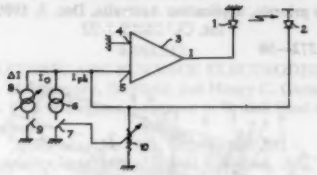
feedback means connected between the output of said laser diode and the input of said laser diode;

first switching means for supplying to said feedback means a DC biasing current provided by a DC biasing current source;

second switching means for supplying to said feedback means an information carrying current provided by an information carrying current source when said second switch means is in a closed position;

variable resistor means connected to said feedback means and forming a closed loop with said information carrying

current source, wherein said variable resistor means is controlled by the operation of said first switch means to provide a resistance value of zero when said first switch means is in an open position and a resistance value of infinity when said first switch means is in a closed position, and wherein the value of said resistance progressively increases between said zero value and said infinity



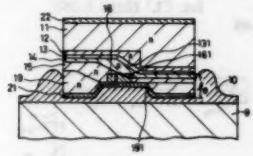
value when the position of said first switch means proceeds from an open to a closed position and wherein the value of said resistance progressively decreases between said infinity value and said zero value when the position of said first switch means proceeds from an open to an closed position, in order to ensure that the biasing of said laser diode by said bias current precedes the input of said information-carrying current into said diode.

4,488,306

TERRACED SUBSTRATE SEMICONDUCTOR LASER

Takashi Sugino, Takatsuki; Kunio Itoh, Uji; Masaru Wada, Takatsuki; Hirokazu Shimizu, Toyonaka; Hiroyuki Mizuno, Takarazuka, and Kazuo Fujimoto, Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Mar. 15, 1982, Ser. No. 358,104
Claims priority, application Japan, Mar. 20, 1981, 56-40935
Int. Cl.³ H01S *3/19*
U.S. Cl. 372—46 **7 Claims**



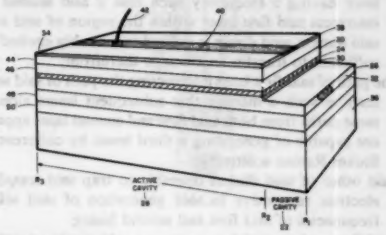
1. In a semiconductor laser comprising:
a terraced substrate having a step on its principal face,
a first epitaxial layer, a second epitaxial layer as an active layer and a third epitaxial layer formed in said order on said principal face for forming a double heterojunction structure wherein an active region is defined between two bendings of said active layer,
a fourth layer formed on said third layer,
characterized in that
a fifth layer having the same conductivity as that of said substrate, formed on said fourth layer and having an opening above said active region, and
a diffused region formed by a diffusion of an impurity to form an opposite conductivity type to that of said fourth layer through said opening into said fourth layer in a manner that one corner of a diffusion front penetrates said third layer.

4,488,307

THREE-MIRROR ACTIVE-PASSIVE SEMICONDUCTOR LASER

Elsa M. Garmire, Manhattan Beach; Gary A. Evans, Los Angeles, and Joseph W. Niesen, Anaheim, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 7, 1982, Ser. No. 385,739
Int. Cl.³ H01S *3/19*
U.S. Cl. 372—50 **6 Claims**



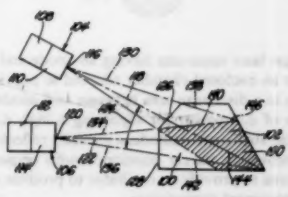
1. In a semiconductor laser, a semiconductor heterostructure, comprising:
an active laser region epilayered to a waveguide that extends beyond the longitudinal dimension of said active laser region on one end of said waveguide;
a first mirror integral to a first longitudinal end of said active laser layer and integral to a first longitudinal end of said waveguide, a second mirror integral to the opposite longitudinal end of said waveguide; and
a third mirror integral to the opposite longitudinal end of said active laser layer;
wherein the longitudinal dimension between said first mirror and said third mirror defines an active laser cavity of said structure, and the portion of said waveguide that extends beyond said active laser cavity forms a passive laser cavity of said structure; and
the length of said active cavity and the length of said passive cavity are each equal to an integral number of half wavelengths of the same laser frequency.

4,488,308

ELECTRONIC BISTABLE THREE-DIMENSIONAL ARRAY

W. Martin McClain, 628 Canfield, Detroit, Mich. 48201

Filed Aug. 27, 1982, Ser. No. 412,136
Int. Cl.³ H01S *3/22*
U.S. Cl. 372—57 **2 Claims**



1. In an electronic bistable three-dimensional array, the improvements comprising:
a solid material;
said solid material doped with at least two different dimers;
one of said dimers having characteristic frequencies for achieving different energy states;
the other of said dimers having another set of characteristic frequencies of excitation for different excitation states;

the frequencies for said excitations being in the range of frequencies characteristic of electromagnetic waves in the visible and ultraviolet spectrum;

a first laser excitation and directing apparatus;

a second laser generating and directing apparatus;

said first laser apparatus selectively operable to emit a laser having a frequency within the end frequencies capable of exciting a first level within a level of excitation in one of said dimers;

said second laser apparatus selectively operable to emit a laser having a frequency such that if said second laser intersects said first laser within the region of said one of said dimers, said dimer is excited to a doubly excited level sufficient to transfer an electron therefrom;

the path of said first laser intersecting the path of said second laser in such a manner that subsequent lasers along the same paths from both said first and second laser apparatus are capable of generating a third beam by coherent anti-Stokes Raman scattering;

said other of said dimers operable to trap said transferred electron responsive to said generation of said selected frequencies of said first and second lasers;

said first and second laser apparata selectively operable to emit lasers of selected frequencies such that the simultaneous intersection of said lasers by said second selected frequency selection is operable to raise the excitation within the other of said dimers sufficient to transfer the previously transferred electron back to said one of said dimers;

whereby a region within said solid can be selectively energized to a first level distinct from a de-energized state selectively determined by coherent anti-Stokes Raman scattering as to whether said first excitation level has been achieved.

4,488,309

GAS LASER APPARATUS

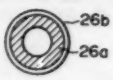
Masaaki Tanaka; Yukio Sato; Masao Hishii, and Haruhiko Nagai, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 13, 1982, Ser. No. 417,287

Claims priority, application Japan, Sep. 16, 1981, 56-145679; Jul. 1, 1982, 57-114628

Int. Cl.³ H01S *3/097*

U.S. Cl. 372—87 **23 Claims**



1. A gas laser apparatus having an anode and cathode positioned in an enclosed chamber adapted to provide a stream of laser gas in a discharge area between said anode and cathode, a source of d.c. power for supplying a high d.c. voltage between said anode and cathode, a partially reflecting mirror and a total reflecting mirror positioned with respect to said discharge area to provide an oscillator to produce a laser output, the improvement comprising:

a dielectric electrode positioned in said discharge area between said anode and said cathode, and

a high voltage a.c. power source connected to provide high voltage a.c. power to said dielectric electrode, whereby a silent discharge is excited between said dielectric electrode and said cathode and anode and a large current glow discharge is produced between said anode and cathode to thereby emit a high power laser output.

4,488,310

CONTINUOUSLY EXCITED LASER

Ross C. McLeary, Elsternwick, and Peter J. Beckwith, Strathmore, both of Australia, assignors to The Commonwealth of Australia, Canberra, Australia

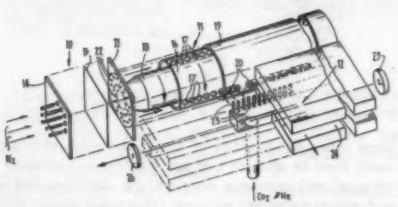
PCT No. PCT/AU81/00177, § 371 Date Jun. 4, 1982, § 102(e) Date Jun. 4, 1982, PCT Pub. No. WO82/01964, PCT Pub. Date Jun. 10, 1982

Pub. Date Dec. 2, 1981, Ser. No. 387,880

Claims priority, application Australia, Dec. 3, 1980, PE6731

Int. Cl.³ H01S *3/22*

U.S. Cl. 372—58 **10 Claims**



1. A method of obtaining a repetitively-pulsed output from a continuously excited gas laser, said method comprising continuously producing by electric discharge, in an excitation zone, a stream of excited gas of a type producing a population inversion and having a long excitation life, storing said excited gas in a storage zone and subsequently transferring said gas, in the form of pulses of gas under pressure, to a power extraction zone containing a resonator to provide a coherent output.

4,488,311

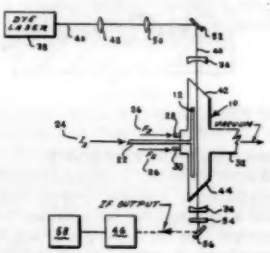
OPTICALLY PUMPED IODINE MONOFLUORIDE LASER

Steven J. Davis, Albuquerque, and Leonard Hanko, Rio Rancho, both of N. Mex., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 23, 1981, Ser. No. 324,346

Int. Cl.³ H01S *3/095*

U.S. Cl. 372—89 **4 Claims**



1. An optically pumped laser system which comprises:

(A) a resonant cavity bounded by a substantially totally reflective mirror and a partially transmissive mirror;

(B) nozzle means for directing a first molecular iodine gaseous reactant and a second molecular fluorine gaseous reactant into said resonant cavity to produce an iodine monofluoride lasing medium in the form of a non-stable, chemiluminescent, reaction product; and

(C) a source of optical pumping energy positioned to direct an energy beam of electromagnetic energy at said lasing

medium to effect its population inverson and thereby produce laser energy.

4,488,312

ELECTRIC ARC FURNACE ELECTRODES

Robert W. Montgomery, Sheffield, and Henry C. Garner, Mexborough, both of England, assignors to British Steel Corporation, England

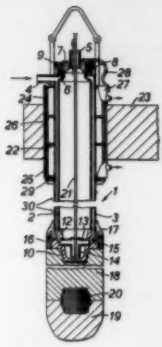
Filed May 24, 1983, Ser. No. 497,591

Claims priority, application United Kingdom, Jun. 4, 1982, 8216323

Int. Cl.³ H05B 7/08

U.S. Cl. 373—93 12 Claims

1. An electrode for an arc furnace comprising a tubular metal column having inner and outer coaxial walls, the two walls being electrically insulated from one another and defining an annular channel between them, a conductive screw-threaded member to which the inner wall is electrically connected at one end thereof, and an elongated carbon or graphite section depending from said member, the inner wall defining a central channel constituting a water flow path connection in series with the annular channel via the said member.



DESIGN PATENTS

GRANTED DEC. 11, 1984

ERRATA

For CLASS	See PATENT NO.
D14–053	276,692

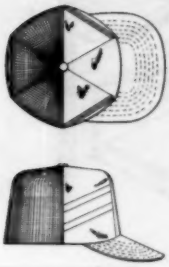
DESIGNS

DECEMBER 11, 1984

276,664
SHIRT
Presley H. Portwood, 400 Orchard Dr., Taylors, S.C. 29687; Philip N. Simmons, 7 Nash St., Greenville, S.C. 29601, and Sandra L. Coppage, 37 Lisa Dr., Greenville, S.C. 29615
Division of Ser. No. 254,923, Apr. 16, 1981, Pat. No. Des. 269,221. This application Oct. 18, 1982, Ser. No. 435,060
Term of patent 14 years
U.S. Cl. D2—208

276,665
EAR MUFF ATTACHMENT FOR SAFETY HAT
John B. Higginson, Sydney, Australia, assignor to Protector Safety Industries Limited, North Sydney, Australia
Filed Nov. 16, 1981, Ser. No. 321,687
Claims priority, application Australia, Mar. 31, 1981, 83,772
Term of patent 14 years
U.S. Cl. D2—233

276,666
SPORTS CAP
Edward V. Bryant, 2323 E. Main St., Richmond, Va. 23223
Filed Mar. 31, 1982, Ser. No. 363,923
Term of patent 14 years
U.S. Cl. D2—244



276,667
BOOT JACK OR SIMILAR ARTICLE
Timothy J. Tracey, 639 Rex Blvd., Warren, Ohio 44483
Filed May 10, 1982, Ser. No. 376,246
Term of patent 14 years
U.S. Cl. D2—378.2

276,668
COMBINATION WALKING STICK AND SHOOTING REST
William J. Minneman, Clayton, Ohio, assignor to MTM Molded Products Company, Dayton, Ohio
Filed Sep. 13, 1982, Ser. No. 416,813
Term of patent 14 years
U.S. Cl. D3—7

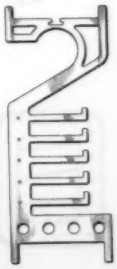
276,669
INVERTIBLE WHEELED STOOL FOR A CHILD
Nils A. I. Petersson, Killeberg, and Nils B. L. Sander, Osby, both of Sweden, assignors to Brio Toy AB, Osby, Sweden
Filed May 20, 1982, Ser. No. 380,099
Term of patent 14 years
U.S. Cl. D6—335

276,670
RECLINER CHAIR
Rogelio Tornero, and Mario Terraneo, both of Greensboro, N.C., assignors to Cone Mills Corporation, Greensboro, N.C.
Filed Sep. 1, 1982, Ser. No. 413,803
Term of patent 14 years
U.S. Cl. D6—360

276,671
CHAIR
Bobby J. Welsh, Shelbyville, Ind., assignor to Hickory Furniture Works, Inc., Shelbyville, Ind.
Filed Aug. 18, 1982, Ser. No. 409,335
Term of patent 14 years
U.S. Cl. D6—369

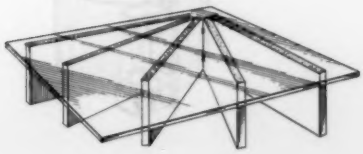
276,672
CHAIR
Carlo Giorgetti, Meda, Italy, assignor to Giorgetti SpA, Meda, Italy
Filed Mar. 16, 1982, Ser. No. 358,782
Claims priority, application Italy, Sep. 17, 1981, 22959/81[U]
Term of patent 14 years
U.S. Cl. D6—380

276,673
TIE RACK OR THE LIKE
William D. Ritchey, 1617 M St., Bedford, Ind. 47421
Filed Jul. 22, 1982, Ser. No. 400,742
Term of patent 14 years
U.S. Cl. D6—327



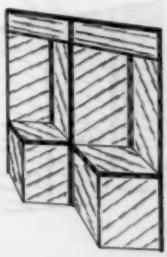
276,674
CREDENZA
Charles Gwathmey, New York, and Robert Siegel, Bedford, both of N.Y., assignors to Knoll International, Inc., New York, N.Y.
Division of Ser. No. 272,044, Jun. 9, 1981, Pat. No. Des. 274,681. This application Jul. 29, 1983, Ser. No. 518,687
Term of patent 14 years
U.S. Cl. D6—446

276,675
COFFEE TABLE
Demir Hamami, 2724 Briggs Chaney Rd., Silver Spring, Md. 20904
Filed Apr. 22, 1982, Ser. No. 370,619
Term of patent 14 years
U.S. Cl. D6—483

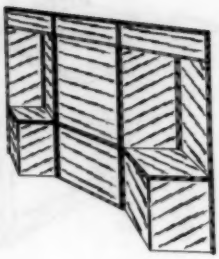


276,676
GAME TABLE
Clarence R. Duncan, Jr., 305 Kemp Rd. West, Greensboro, N.C. 27410
Filed Mar. 29, 1982, Ser. No. 362,647
Term of patent 14 years
U.S. Cl. D6—425

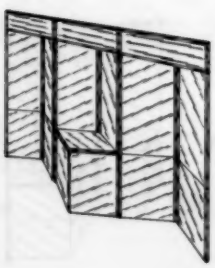
276,677
DISPLAY STAND
Melvin M. Miller, Bloomington, Ind., assignor to Channel-Kor Systems Inc., Bloomington, Ind.
Filed Jun. 18, 1982, Ser. No. 389,575
The portion of the term of this patent subsequent to Nov. 13, 1998, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—471



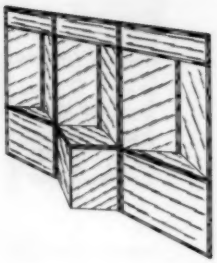
276,678
DISPLAY STAND
Melvin M. Miller, Bloomington, Ind., assignor to Channel-Kor Systems Inc., Bloomington, Ind.
Filed Jun. 18, 1982, Ser. No. 389,576
Term of patent 14 years
U.S. Cl. D6—471



276,679
DISPLAY STAND
Melvin M. Miller, Bloomington, Ind., assignor to Channel-Kor Systems Inc., Bloomington, Ind.
Filed Jun. 18, 1982, Ser. No. 389,577
Term of patent 14 years
U.S. Cl. D6—471

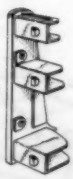


276,680
DISPLAY STAND
Melvin M. Miller, Bloomington, Ind., assignor to Channel-Kor Systems Inc., Bloomington, Ind.
Filed Jun. 18, 1982, Ser. No. 389,579
Term of patent 14 years
U.S. Cl. D6—471

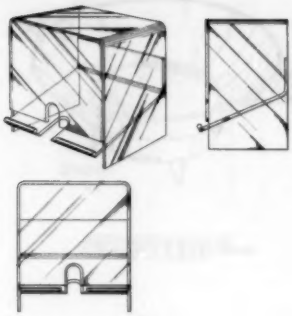


276,681
CHAIR FRAME
Stewart K. McKay, 34 Verdichio Ave., Mermaid Waters, Gold Coast, Queensland, Australia 4218
Filed May 7, 1982, Ser. No. 376,149
Term of patent 14 years
U.S. Cl. D6—373

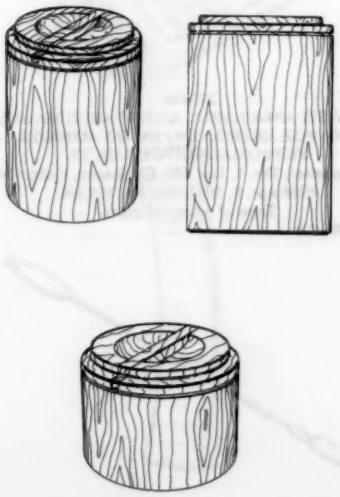
276,682
CONNECTOR FOR USE IN THE CONSTRUCTION OF A DRAWER
Terence Hardy, Belper, England, assignor to L. B. (Plastics) Limited, Belper, England
Filed May 24, 1982, Ser. No. 380,990
Claims priority, application United Kingdom, Nov. 26, 1981, 1003818
Term of patent 14 years
U.S. Cl. D6—510



276,683
STIRRER DISPENSER
John J. Silva, 8 Truman St., Johnston, R.I. 02919
Filed Jul. 8, 1982, Ser. No. 396,350
Term of patent 14 years
U.S. Cl. D7—75



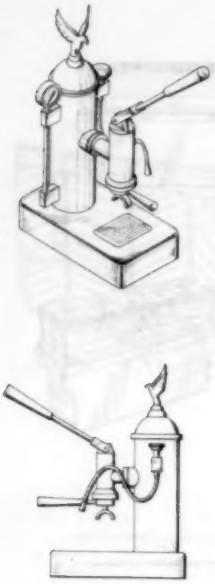
276,684
CANISTER
Charles E. Sublett, R.F.D. 1, Box 322, Bridgton, Me. 04009
Filed Oct. 19, 1982, Ser. No. 435,227
Term of patent 14 years
U.S. Cl. D7—79



276,685
HAND OPERATED MEAT TENDERIZER
André R. Jaccard, Holland, N.Y., assignor to Jaccard Corporation, Orchard Park, N.Y.
Filed May 14, 1982, Ser. No. 378,058
The portion of the term of this patent subsequent to Dec. 4, 1998, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—101

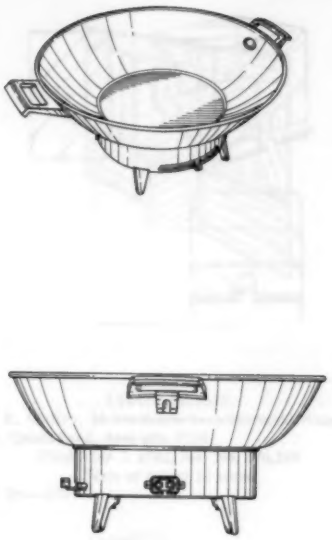
276,686
SPOON
Vivienne D. Jagger, St. Ives, Australia, assignor to Little People Limited, Hong Kong
Filed May 3, 1982, Ser. No. 374,274
Claims priority, application United Kingdom, Nov. 2, 1981, 1003338
The portion of the term of this patent subsequent to Dec. 13, 1997, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—151

276,687
COFFEEMAKER
Justo T. Marin, Calle 8 No. 21, Fracc. Alce Blanco, Edo. de México, Mexico City, Mexico
Filed Dec. 2, 1982, Ser. No. 446,406
Term of patent 14 years
U.S. Cl. D7—301



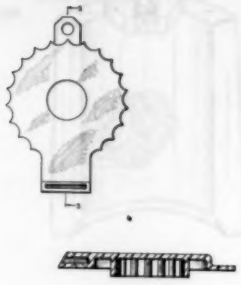
276,688
SPORTSMAN'S GRILL
Ronald Lee, 4606 Neal Rd., Apt. 165, Reno, Nev. 89502
Filed Dec. 9, 1982, Ser. No. 448,301
Term of patent 14 years
U.S. Cl. D7—332

276,689
WOK
Carl R. Spoeth, Jr., Kewaskum, Wis., assignor to Dart Industries Inc., Northbrook, Ill.
Filed Sep. 9, 1982, Ser. No. 416,517
Term of patent 14 years
U.S. Cl. D7—355

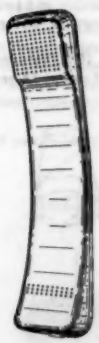


276,690
WAND WITH ANGULARLY ADJUSTABLE MAGNETIC END FOR RETRIEVING SMALL REMOTE FERROMAGNETIC OBJECTS
George Hamatani, Rte. 1, Box 400, Clarksburg, Calif. 95612
Filed Apr. 8, 1982, Ser. No. 366,494
Term of patent 14 years
U.S. Cl. D8—14

276,691
COMBINED BOTTLE AND TAB-CAN OPENER
Fred Nielsen, P.O. Box 9051, San Diego, Calif. 92109
Filed Mar. 25, 1982, Ser. No. 334,090
Term of patent 14 years
U.S. Cl. D8—40



276,692
TELEPHONE INSTRUMENT SET
Eric J. Marshall, London, England, assignor to The Marshall Telephone Corporation Limited, Kent, England
Filed Mar. 8, 1982, Ser. No. 355,972
Claims priority, application United Kingdom, Sep. 11, 1981, 1002431
Term of patent 14 years
U.S. Cl. D14—53

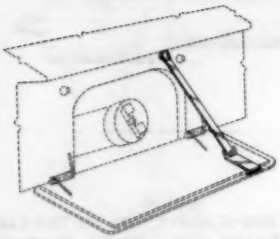


276,693
HAND-HELD FINISHING TOOL OR SIMILAR APPARATUS
Addis P. Elmore, 1026 Irene, Mesquite, Tex. 75149
Filed May 3, 1982, Ser. No. 373,983
Term of patent 14 years
U.S. Cl. D8—61

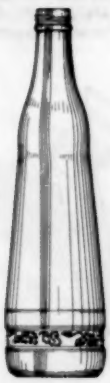
276,694
HANDLE FOR GLASS CUTTER OR THE LIKE
Mellen-Thomas Benedict, 4760 Yadkin Rd., Fayetteville, N.C. 28303
Filed Jan. 22, 1982, Ser. No. 341,806
Term of patent 14 years
U.S. Cl. D8—107

276,695
DETACHABLE HANDLE FOR PAINT CANS OR THE LIKE
Arthur W. Hanna, 9706 Wheatland Ave., Sunland, Calif. 91040
Filed Sep. 20, 1982, Ser. No. 419,915
Term of patent 14 years
U.S. Cl. D8—320

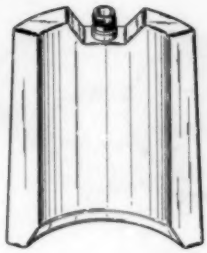
276,696
FUEL FILLER DOOR PROP
Joseph G. Spinka, Rte. 1, Box 439, Antioch, Ill. 60002
Filed Aug. 11, 1981, Ser. No. 291,976
Term of patent 14 years
U.S. Cl. D8—349



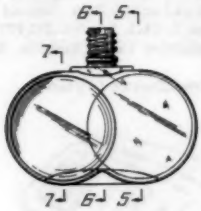
276,697
BOTTLE
Gianni E. Martini, Cuneo, Italy, assignor to Ditta F.LLI Martini Secondo Luigi S.n.C., Cuneo, Italy
Filed Feb. 18, 1982, Ser. No. 350,059
Claims priority, application Italy, Aug. 31, 1981, 53564 B/81[U]
Term of patent 14 years
U.S. Cl. D9—370



276,698
BOTTLE
Arthur R. Carlson, 401A Waverley Rd., East Malvern, Victoria, 3144, Australia
Filed Mar. 1, 1982, Ser. No. 353,339
Term of patent 14 years
U.S. Cl. D9—372



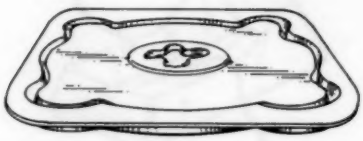
276,699
BOTTLE
Serge Mansau, Neuilly sur Seine, France, assignor to American Cyanamid Company, Stamford, Conn.
Filed Jun. 18, 1982, Ser. No. 389,651
Claims priority, application France, Jan. 15, 1982, 820110
Term of patent 14 years
U.S. Cl. D9—403



276,700
COMBINED MODIFIED HOOD AND COLLAR ASSEMBLY
John M. Brown; Donald Herritz, and Leland D. Westmas, all of Reedsburg, Wis., assignors to Gerber Products Company, Fremont, Mich.
Filed Oct. 22, 1982, Ser. No. 436,155
Term of patent 14 years
U.S. Cl. D9—436

276,701
CONTAINER CLOSURE
Vasant J. Shend'ge, London, and Geoffrey S. Thompson, Windlesham, both of England, assignors to Multicore Solders Limited, Hemel Hempstead, England
Filed Mar. 12, 1982, Ser. No. 357,767
Claims priority, application United Kingdom, Jan. 8, 1982, 1004524
Term of patent 14 years
U.S. Cl. D9—439

276,702
STACKABLE TRAY FOR MAGNETIC TAPE
Charles E. Entenmann, Riviera Beach; Gary A. Adams, and Steven L. Dewel, both of Sebring, all of Fla., assignors to Florida Containers, Inc., Sebring, Fla.
Filed Aug. 2, 1982, Ser. No. 404,583
Term of patent 14 years
U.S. Cl. D9—456



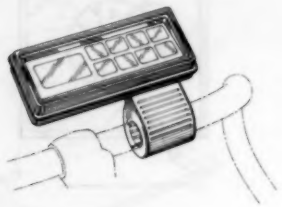
276,703
ELECTRONIC CLOCK
Ser K. Au, Kowloon, Hong Kong, assignor to A A Electronics (International) Limited, Kowloon, Hong Kong
Filed May 27, 1982, Ser. No. 382,836
Claims priority, application United Kingdom, Apr. 15, 1982, 1003909
Term of patent 14 years
U.S. Cl. D10—15

276,704
CLOCK
Michael A. Eddy, 1711 Florida St., Long Beach, Calif. 90802
Filed Jul. 2, 1982, Ser. No. 394,693
Term of patent 14 years
U.S. Cl. D10—25

276,705
EGG-SHAPED TIMER
Lucio Oliveri, Milan, Italy, assignor to Italora S.p.A., Milan, Italy
Filed Jan. 29, 1982, Ser. No. 343,979
Claims priority, application Italy, Sep. 17, 1981, 22961/B81
Term of patent 14 years
U.S. Cl. D10—40

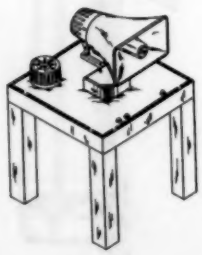
276,706
BIOMECHANICAL MEASURING INSTRUMENT
Martin E. Jenness, 677 Ala Moana Blvd., Honolulu, Hi. 96813
Filed Jan. 4, 1982, Ser. No. 336,515
Term of patent 14 years
U.S. Cl. D10—62

276,707
BICYCLE SPEEDOMETER
Marc H. Segan, 154 W. 70th St., New York, N.Y. 10023; Sayre Swarztrauber, 301 E. 79th St., New York, N.Y. 10021, and Ido Yavetz, 89 University St. Ramat Aviv, Tel Aviv, Israel
Filed Jul. 28, 1982, Ser. No. 402,646
Term of patent 14 years
U.S. Cl. D10—98



276,708
FIRE ALARM HOUSING
Roger A. Simpson, Lincoln, Nebr., assignor to Emhart Industries, Inc., Indianapolis, Ind.
Filed Jun. 10, 1982, Ser. No. 387,024
Term of patent 14 years
U.S. Cl. D10—104

276,709
PORTABLE BURGLAR ALARM
Starr Parker, Loveland, Colo., assignor to Starr Security Systems, Inc., Loveland, Colo.
Filed Nov. 9, 1981, Ser. No. 319,201
Term of patent 14 years
U.S. Cl. D10—106

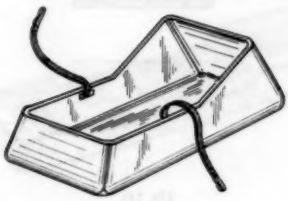


276,710
MOTOR VEHICLE CAB
Ronald N. Brunger, Fort Wayne; Lawrence G. Nicklin, Leo, and Charles W. Harris, Fort Wayne, all of Ind., assignors to International Harvester Co., Chicago, Ill.
Filed Nov. 9, 1981, Ser. No. 319,164
Term of patent 14 years
U.S. Cl. D12—96

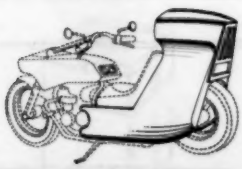
276,711
TIRE
Armand M. Menster, Ettelbruck, Luxembourg, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Mar. 17, 1982, Ser. No. 358,969
Term of patent 14 years
U.S. Cl. D12—146

276,712
COMBINED ARTICLE CARRIER AND BACKREST FOR A MOTORCYCLE
Yoshiaki Kashio, Fujimi, and Toshiyuki Yamada, Niiza, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 18, 1982, Ser. No. 359,527
Claims priority, application Japan, Sep. 19, 1981, 56/41632
Term of patent 14 years
U.S. Cl. D12—158

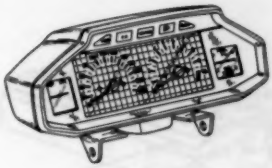
276,713
PET CARRIER FOR A BICYCLE OR THE LIKE
Hilary Schacter, 228 Comanche Dr., Oceanport, N.J. 17757
Filed Sep. 22, 1982, Ser. No. 421,365
Term of patent 14 years
U.S. Cl. D12—158



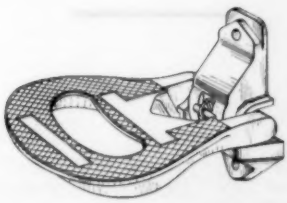
276,714
MOTORCYCLE BODY PANEL
Bruce D. Omholt, 2117 Richmond, NW., Grand Rapids, Mich. 49504
Filed Jun. 17, 1983, Ser. No. 505,410
Term of patent 14 years
U.S. Cl. D12—110



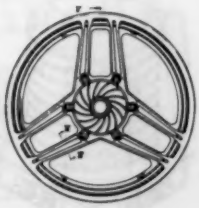
276,715
INSTRUMENT PANEL AND HOUSING FOR A MOTORCYCLE
Minoru Morioka, Kawagoe, and Kuniaki Ryuzoji, Yokohama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 18, 1982, Ser. No. 359,504
Claims priority, application Japan, Sep. 19, 1981, 56/41636
Term of patent 14 years
U.S. Cl. D12—192



276,716
FOLDING STEP
Donald J. Dignan, South Euclid, Ohio, assignor to The Eastern Company, Cleveland, Ohio
Filed Jan. 7, 1983, Ser. No. 456,370
Term of patent 14 years
U.S. Cl. D12—203



276,717
WHEEL FOR MOTORCYCLE
Tetuo Ogishima, Shiki, and Aiko Hiratsuka, Fijimi, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 12, 1982, Ser. No. 357,651
Claims priority, application Japan, Sep. 19, 1981, 56/41630
Term of patent 14 years
U.S. Cl. D12—211



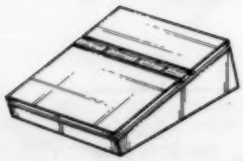
276,718
ELECTRONIC CONSOLE FOR THE REMOTE CONTROL OF HOUSE LIGHTS, APPLIANCES AND SIMILAR DEVICES

John W. Goodin, Long Beach, and Charlie A. Patterson, Costa Mesa, both of Calif., assignors to Dart Industries Inc., Northbrook, Ill.

Filed Jun. 2, 1982, Ser. No. 384,313

Term of patent 14 years

U.S. Cl. D13—12



276,719
INTEGRATED CIRCUIT DEVICE

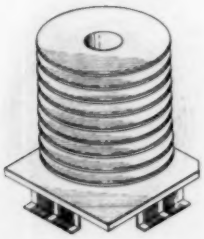
Masahiro Sugimoto, Yokosuka; Hidehiko Akasaki, Kawasaki, and Tetsushi Wakabayashi, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jul. 12, 1982, Ser. No. 397,051

Claims priority, application Japan, Jan. 14, 1982, 57-950

Term of patent 14 years

U.S. Cl. D13—99



276,720
COMBINED TELEVISION, RADIO RECEIVER AND TAPE RECORDER

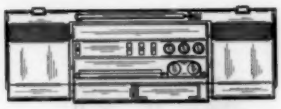
Naoki Wada; Tomitaro Saito, and Takeo Hashiba, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Jun. 18, 1982, Ser. No. 389,753

Claims priority, application Japan, Dec. 29, 1981, 56-57941

Term of patent 14 years

U.S. Cl. D14—5



276,721
TELEPHONE

Eric J. Marshall, London, England, assignor to The Marshall Telephone Corporation Limited, Kent, England

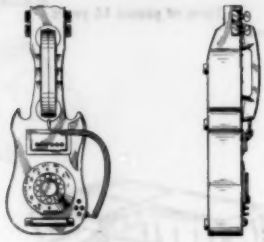
Filed Mar. 8, 1982, Ser. No. 355,973

Claims priority, application United Kingdom, Sep. 7, 1981, 1002347

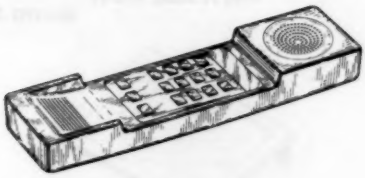
Term of patent 14 years

U.S. Cl. D14—53

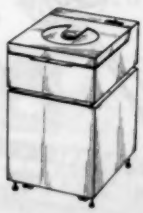
276,722
TELEPHONE
Lawrence M. Festa, 238 Cajon St., Laguna Beach, Calif. 92651
Filed Sep. 20, 1982, Ser. No. 419,768
Term of patent 14 years
U.S. Cl. D14—53



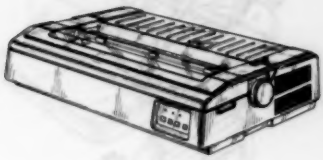
276,723
HANDSET TELEPHONE INSTRUMENT
Eric J. Marshall, London, England, assignor to The Marshall Telephone Corporation Limited, Kent, England
Filed Jan. 15, 1982, Ser. No. 339,833
Claims priority, application United Kingdom, Jul. 15, 1981, 1001491
Term of patent 14 years
U.S. Cl. D14—64



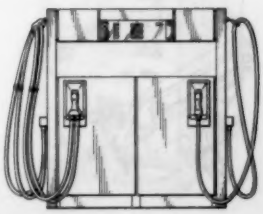
276,724
STORAGE DEVICE FOR IMAGE INFORMATION STORING/RETRIEVING MACHINE
Kunio Hara, Chiba, and Shigeki Yasutani, Kashiwa, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan
Filed Jul. 2, 1982, Ser. No. 394,653
Claims priority, application Japan, Jan. 7, 1982, 57/00086
Term of patent 14 years
U.S. Cl. D14—107



276,725
PRINTER FOR ELECTRONIC COMPUTERS
Kenzou Izaki, Chiba, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Japan
Filed Jul. 28, 1982, Ser. No. 402,536
Claims priority, application Japan, Feb. 24, 1982, 57/7292
Term of patent 14 years
U.S. Cl. D14—111



276,726
FUEL DISPENSER
John A. Todd, and Richard G. Bisker, both of Salisbury, Md., assignors to Dresser Industries, Inc., Dallas, Tex.
Filed Jun. 30, 1982, Ser. No. 394,019
Term of patent 14 years
U.S. Cl. D15—9.2



276,727

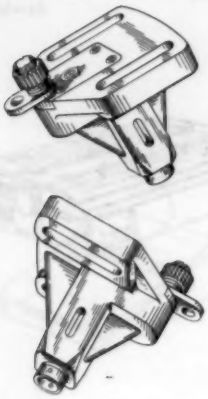
HOLDER FOR MULTIPLE SPINDLE ATTACHMENT

Eiji Miyakawa, Tokyo, Japan, assignor to Miyakawa Industry Co., Ltd., Seki, Japan

Filed Dec. 6, 1982, Ser. No. 447,498

Term of patent 14 years

U.S. Cl. D15—140



276,728

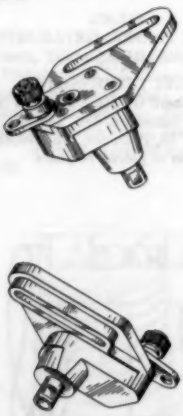
HOLDER FOR MULTIPLE SPINDLE ATTACHMENT

Eiji Miyakawa, Tokyo, Japan, assignor to Miyakawa Industry Co., Ltd., Seki, Japan

Filed Dec. 6, 1982, Ser. No. 447,499

Term of patent 14 years

U.S. Cl. D15—140



276,729

SLIDE VIEWER

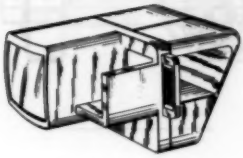
Francis Bonnefoy, 87 rue Grande, 77300 Fontainebleau, France, assignor to Posso S.A., France

Filed Jul. 20, 1982, Ser. No. 400,129

Claims priority, application Hague, Apr. 13, 1982, DM/001372

Term of patent 14 years

U.S. Cl. D16—17



276,730

PAN HEAD ASSEMBLY

Koma Nakatani, Tokyo, Japan, assignor to Velbon International Cororation, Torrance, Calif.

Filed Oct. 22, 1982, Ser. No. 435,998

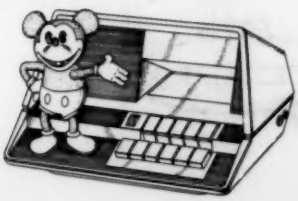
Term of patent 14 years

U.S. Cl. D16—46

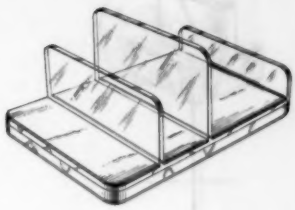
276,731
THERMOSTAT MAGNIFIER
Gerald R. Steiner, 3660 Independence Ave., South, #32, St. Louis Park, Minn. 55426
Filed Jun. 6, 1983, Ser. No. 501,484
Term of patent 14 years
U.S. Cl. D16—134

276,732
PORTABLE DRAWING BOARD
Mary K. Marquez, 1915 N. 84th St., Omaha, Nebr. 68114
Filed Apr. 26, 1982, Ser. No. 372,157
Term of patent 14 years
U.S. Cl. D19—52

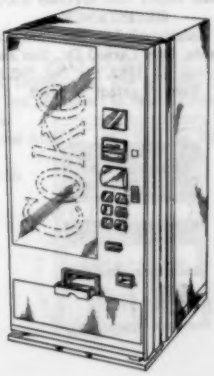
276,733
TEACHING MACHINE
Dietmar Nagel, Chester, N.J.; Andrew Lowinger, Brooklyn, N.Y., and Peter Roegner, Far Hills, N.J., assignors to North American Foreign Trading Corporation, New York, N.Y.
Filed Jan. 13, 1981, Ser. No. 224,750
The portion of the term of this patent subsequent to Oct. 18, 1997, has been disclaimed.
Term of patent 14 years
U.S. Cl. D19—60



276,734
READING SUPPORT FOR HANDICAPPED
Stig L. Landström, Brinkaka vägen 1A, S-152 00 Strängnäs, Sweden
Filed Jun. 9, 1982, Ser. No. 386,629
Term of patent 14 years
U.S. Cl. D19—91

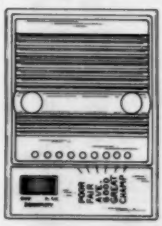


276,735
VENDING MACHINE
G. Merle Bachmann, Stone Mountain; Charles L. Davis, and Annis R. Morgan, Jr., both of Atlanta, all of Ga., assignors to The Coca-Cola Company, Atlanta, Ga.
Continuation-in-part of Ser. No. 236,184, Feb. 20, 1981, Pat. No. 267,498. This application Dec. 4, 1981, Ser. No. 327,459
Term of patent 14 years
U.S. Cl. D20—5



276,736
COMBINED STREET NAME AND ADVERTISING SIGN
Moshe Maya, and Tamar Maya, both of c/o Dr. Leon, 4140 Pine Tree Dr., Apartment 1203, Miami Beach, Fla. 33140
Filed Sep. 30, 1982, Ser. No. 431,795
Term of patent 14 years
U.S. Cl. D20—17

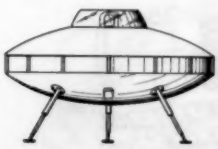
276,737
CASE FOR GAME THAT MONITORS GALVANIC SKIN RESISTANCE
Joe Zapata, 1039 Alderbrook La., San Jose, Calif. 95129, and Dominic Rapisarda, 1499 Carmel Dr., San Jose, Calif. 95125
Filed Jun. 21, 1982, Ser. No. 390,225
Term of patent 14 years
U.S. Cl. D21—48



276,738
TOY DOG TEETHER
Valerie Daugherty, Alta Loma, Calif., assignor to Questor Corp., Tampa, Fla.
Filed Sep. 30, 1982, Ser. No. 431,673
Term of patent 14 years
U.S. Cl. D21—65

276,739
TOY CLOWN RATTLE
Terry Paczko, Cleveland, Ohio, assignor to Questor Corp., Tampa, Fla.
Filed Sep. 30, 1982, Ser. No. 431,674
Term of patent 14 years
U.S. Cl. D21—65

276,740
COMBINED TOY SPACESHIP AND FIGURE THEREFOR
Anne W. Stockvis, 3636 16th St., NW. Apt. B-1211, Washington, D.C. 20010
Filed Jun. 29, 1981, Ser. No. 278,887
Term of patent 14 years
U.S. Cl. D21—86



276,741
TOY DRESSING TABLE
Mel Appel, Nine Nottingham Rd., Livingston, N.J. 07039, and George Kress, Scotch Plains, N.J., assignors to Mel Appel, Livingston, N.J.
Filed Jun. 21, 1982, Ser. No. 390,218
Term of patent 14 years
U.S. Cl. D21—121

276,742
LOCOMOTIVE TOY
Joanny Lardy, Lavancia, Dortan 01590, France
Filed Apr. 20, 1982, Ser. No. 370,024
Claims priority, application France, Jan. 11, 1982, 820062
Term of patent 14 years
U.S. Cl. D21—129

276,743
SPRINKLER
Franco Clivio, Ulm, and Dieter Raffler, Neu-Ulm, both of Fed. Rep. of Germany, assignors to Gardena Kress and Kastner GmbH, Fed. Rep. of Germany
Filed Dec. 1, 1982, Ser. No. 445,899
Claims priority, application Fed. Rep. of Germany, Jun. 18, 1982, GRA III 1034/82-03
Term of patent 14 years
U.S. Cl. D23—7

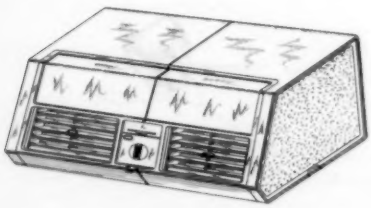
276,744
FAUCET HANDLE
Charles P. Hill, Indianapolis, and Anthony G. Spangler, Westfield, both of Ind., assignors to Masco Corporation of Indiana, Taylor, Mich.
Filed Aug. 26, 1982, Ser. No. 411,867
Term of patent 14 years
U.S. Cl. D23—28

276,745
FAUCET HANDLE
Charles P. Hill, Indianapolis, and Anthony G. Spangler, Westfield, both of Ind., assignors to Masco Corporation of Indiana, Taylor, Mich.
Filed Aug. 26, 1982, Ser. No. 411,868
Term of patent 143 years
U.S. Cl. D23—28

276,746
FAUCET HANDLE
Charles P. Hill, Indianapolis, and Anthony G. Spangler, Westfield, both of Ind., assignors to Masco Corporation of Indiana, Taylor, Mich.
Filed Aug. 26, 1982, Ser. No. 411,869
Term of patent 14 years
U.S. Cl. D23—28

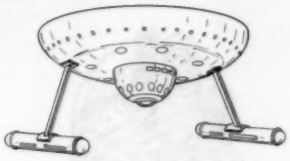
276,747
CATALYTIC HEATING PANEL
Alain Lacroix, Lyons, France, assignor to Societe Lyonnaise Des Applications Catalytiques, Rillieux La Pape, France
Filed Jun. 29, 1982, Ser. No. 393,626
Term of patent 14 years
U.S. Cl. D23—110

276,748
ROOM AIR CLEANER
Masao Tsuji, Old Lyme, Conn., assignor to North American Philips Corporation, New York, N.Y.
Filed Dec. 6, 1982, Ser. No. 447,071
Term of patent 14 years
U.S. Cl. D23—149



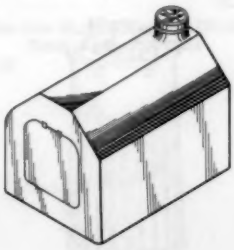
276,749
OIL LAMP
James E. Smithers, 4268 Broadway, Suites A-B, Oakland, Calif. 94611
Filed May 14, 1982, Ser. No. 378,130
Term of patent 14 years
U.S. Cl. D26—11

276,750
LAMP FIXTURE
Bryan Beaver, 4313 Lorna, Las Vegas, Nebr.VADA 89107
Filed Nov. 16, 1981, Ser. No. 321,693
Term of patent 14 years
U.S. Cl. D26—73

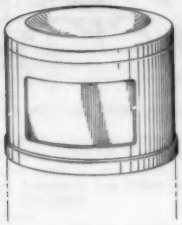


276,751
RAZOR HAIR CUTTER
Evan R. Kahn, 16033 NE. 8th Ave., North Miami Beach, Fla. 33162
Filed Apr. 30, 1982, Ser. No. 373,357
Term of patent 14 years
U.S. Cl. D28—45

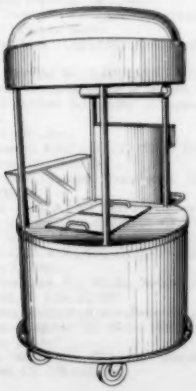
276,752
LITTER BOX FOR CATS
Sylvia J. Kinzie, 826 Jackson St., Vancouver, British Columbia, Canada V6A 3C1
Filed Apr. 19, 1982, Ser. No. 369,889
Claims priority, application Canada, Oct. 27, 1981, 27-10-81-5
Term of patent 14 years
U.S. Cl. D30—99



276,753
COMBINED COVER FOR A TRASH CONTAINER AND ASH TRAY
Dale T. Maza, Stephenson; Larry S. Hawkins; Gary A. Dolphin, Sr., both of Winchester, and Phillip A. Crim, Berryville, all of Va., assignors to Rubbermaid Commercial Products Inc., Winchester, Va.
Filed Sep. 16, 1982, Ser. No. 418,821
Term of patent 14 years
U.S. Cl. D34—11

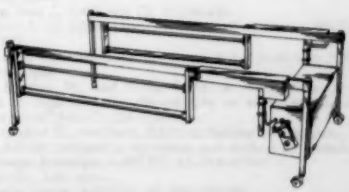


276,754
ICE CREAM CART
Steven J. Smith, 5 Lawson La., Great Neck, N.Y. 11023
Filed Jul. 26, 1982, Ser. No. 402,045
Term of patent 14 years
U.S. Cl. D34—20



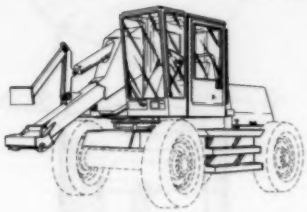
276,755
CART
Harold O. Eads, Parkersburg, W. Va.; Ronald R. Fowler, Coolville, Ohio, and Danny C. Adams, Parkersburg, W. Va., assignors to O. Ames Co., Parkersburg, W. Va.
Filed Oct. 5, 1982, Ser. No. 432,826
Term of patent 14 years
U.S. Cl. D34—26

276,756
APPARATUS FOR TURNING A PERSON CONFINED TO A BED
Torsten Persson, Havstenssund 7583, S-450 81 Grebbestad, Sweden
Filed Jun. 27, 1983, Ser. No. 508,263
Claims priority, application Denmark, Jan. 10, 1983, MA 198322
Term of patent 14 years
U.S. Cl. D34—33



276,757
LIFT TRUCK
John W. Haswell, P.O. Box 106, Southwell Blvd. Ind. Park, Tifton, Ga. 31794
Filed Dec. 19, 1979, Ser. No. 105,209
Term of patent 14 years
U.S. Cl. D34—34

276,758
MATERIAL LIFT VEHICLE BODY
John F. Krueck, Mansfield, and Gregg M. Davis, Columbus, both of Ohio, assignors to Dresser Industries, Inc., Dallas, Tex.
Filed Oct. 14, 1980, Ser. No. 196,801
Term of patent 14 years
U.S. Cl. D34—34



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 11TH DAY OF DECEMBER, 1984

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. O. Smith Harvestore Products, Inc.: *See*—
Olson, George E., 4,487,088, Cl. 74-462.000.

A/S Alfred Benzon: *See*—
Uhlin, Bernt E.; Nordstrom, Kurt; Molin, Soeren; and Gustaffson, Petter, 4,487,835, Cl. 435-317.000.

Aagard, Roger L., to Honeywell Inc. Fiber optic pressure sensor with temperature compensation and reference. 4,487,206, Cl. 128-667.000.

AB Bofors: *See*—
Brattstrom, Leif; Hallstrom, Stig; Gustavsson, Bo; and Mattsson, Kjell, 4,487,130, Cl. 102-476.000.

Abbey Etna Machine Co.: *See*—
Abbey, Nelson D., III, 4,487,046, Cl. 72-52.000.

Abbey, Nelson D., III, to Abbey Etna Machine Co. Transition forming section for tube mill. 4,487,046, Cl. 72-52.000.

Abdenour, Joseph D. Brewing improvement. 4,487,114, Cl. 99-295.000.

Abrahams, Louis: *See*—
Hutchins, Burleigh M.; and Abrahams, Louis, 4,488,241, Cl. 364-513.000.

Abramovich, Abe, to RCA Corporation. Fail-safe circuit for a microcomputer based system. 4,488,303, Cl. 371-62.000.

Acker, Loren C.; Taylor, Junius E.; and Minney, Stephen C., to Engineering & Research Associates, Inc. Electrode mechanical tubing sealer. 4,488,028, Cl. 219-10.810.

Ackermann, Jurgen: *See*—
Kniege, Wilfried; Michel, Werner; Ackermann, Jurgen; and Rudolph, Karl-Heinz, 4,487,906, Cl. 528-15.000.

Acme Resin Corporation: *See*—
Armbruster, David R.; and Rodriguez, Luis R., 4,487,868, Cl. 524-44.000.

Adachi, Hiromi; and Iwaya, Shoichi, to TDK Corporation; and Mitsubishi Denki Kabushiki Kaisha. Discharge lamp lighting device. 4,488,087, Cl. 315-101.000.

Adamick, S. Mark, to T.B.E. Tote for easy carrying of bulky, heavy or odd-shaped loads. 4,487,443, Cl. 294-151.000.

Adams, Frederick J., to Cam Gears Limited. Power assisted steering gear. 4,487,225, Cl. 137-625.220.

Adams, James E.: *See*—
Livens, Michael G.; and Adams, James E., 4,487,596, Cl. 493-125.000.

Adams, James R.: *See*—
Ryden, William D.; Hanson, Matthew V.; Derbenwick, Gary F.; Gnadinger, Alfred P.; and Adams, James R., 4,486,943, Cl. 29-571.000.

Adams Rite Products, Inc.: *See*—
Beijer, Gene, 4,487,440, Cl. 292-336.300.

Aday, Roy W., Jr.: *See*—
Brown, James R.; and Aday, Roy W., Jr., 4,488,051, Cl. 250-561.000.

Adeka Argus Chemical Co., Ltd.: *See*—
Nakahara, Yutaka; and Kimura, Ryoji, 4,487,887, Cl. 525-123.000.
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Adler, Theodore. Orthodontic bracket. 4,487,581, Cl. 433-16.000.

Adur, Ashok M.; Schmukler, Seymour; Machonis, John, Jr.; and Shida, Mitsuzo, to Chemplex Company. Adhesive blends. 4,487,885, Cl. 525-74.000.

Advanced Micro Devices, Inc.: *See*—
Hatcher, Owen W., 4,487,653, Cl. 156-644.000.

AEL Microtel Limited: *See*—
Coppin, James A., 4,487,654, Cl. 156-645.000.

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Frankish, Norman W., 4,487,160, Cl. 118-421.000.

Agarwal, Suresh C., to Babcock & Wilcox Company, The. Temperature control system for olefin oxidation reactor. 4,488,239, Cl. 364-500.000.

Agip Petroli S.p.A: *See*—
Ciuti, Brunello, 4,487,658, Cl. 252-33.200.

Agri-Chain Products, Inc.: *See*—
Worsley, Gail G.; and Woodward, Thomas D., 4,487,013, Cl. 59-84.000.

Ahamed, Syed V., to AT&T Bell Laboratories. Burst error correction using cyclic block codes. 4,488,302, Cl. 371-40.000.

Ahrens, Paul W., to Miracle Recreation Equipment Company. Playground tube slide. 4,487,411, Cl. 272-56.50R.

Ahulii, Robert J.: *See*—
Young, Frederick A.; Ahulii, Robert J.; and Rikimaru, Roy K., 4,488,130, Cl. 333-203.000.

Aigoo, Seiichiro. Method of manufacturing semiconductor device with plated bump. 4,486,945, Cl. 29-588.000.

Aihara, Ryuzo: *See*—
Anazawa, Norimichi; Okunuki, Masahiko; and Aihara, Ryuzo, 4,488,045, Cl. 250-423.00R.

Aisin Seiki Kabushiki Kaisha: *See*—
Mizutani, Ken-Ichiro; Masai, Hiroto; and Kozawa, Nobuyoshi, 4,487,551, Cl. 416-135.000.

Aisin Seiki Kabushikikaisha: *See*—
Arakawa, Susumu; Tsukigahora, Tooru; and Shirai, AKira, 4,487,021, Cl. 60-534.000.

Aiuchi, Susumu: *See*—
Noguchi, Minori; Otsubo, Toru; Aiuchi, Susumu; Kamimura, Takashi; and Fujii, Teru, 4,487,678, Cl. 204-298.000.

Akaba, Noriyuki: *See*—
Terakawa, Takashige; and Akaba, Noriyuki, 4,488,157, Cl. 343-771.000.

Akamatsu, Masahiko, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor switch device. 4,488,059, Cl. 307-253.000.

Akiyama, Katsuyuki: *See*—
Yamabe, Masaaki; Kojima, Gen; and Akiyama, Katsuyuki, 4,487,893, Cl. 525-386.000.

Akiyama, Shigenobu: *See*—
Kugimiya, Koichi; Akiyama, Shigenobu; and Fuse, Genshu, 4,487,635, Cl. 148-1.500.

Akkapeddi, Murali K., to Allied Corporation. Polyamide-polyol-triazine block copolymer and anionic polymrization process. 4,487,920, Cl. 528-323.000.

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Bjork, Hilmer, 4,487,469, Cl. 339-88.00R.

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de Wied, David, 4,487,765, Cl. 424-177.000.

Alaimo, Ben, to Syquest Technology. Servo control apparatus. 4,488,187, Cl. 360-77.000.

Albert-Frankenthal AG: *See*—
Fischer, Rudolf, 4,487,408, Cl. 271-233.000.

Alberta Oil Sands Technology and Research Authority: *See*—
Hyne, James B.; and Tyrer, J. David, 4,487,264, Cl. 166-300.000.

Alcotek, Inc.: *See*—
Wolf, Karl, 4,487,055, Cl. 73-23.000.

Alejos, Luis. Construction-panel prefabrication method, panels thus made and equipment for implemeating said method. 4,486,996, Cl. 52-309.110.

Alexander, Catherine A.: *See*—
Peet, Norton P.; and Alexander, Catherine A., 4,487,930, Cl. 544-234.000.

Alfano, Vincent J. Refrigeration system energy management control device and method. 4,487,026, Cl. 62-101.000.

Allan, G. Graham, to Melamine Chemicals, Inc. Process for bleaching paper pulp using melamine as a viscosity stabilizer. 4,487,656, Cl. 162-73.000.

Allen-Bradley: *See*—
Struger, Odo J.; and Gray, Jon F., 4,488,258, Cl. 364-900.000.

Allen, Earl E., Sr. Educational game device. 4,487,418, Cl. 273-242.000.

Allen, John H.; Portoghese, Joseph; Hebb, Richard C.; and Breglia, Denis R., to United States of America, Navy. Raster shifting delay compensation system. 4,487,584, Cl. 434-44.000.

Allen, Robert L.; and Burgher, Peter H. Insulating panel. 4,486,995, Cl. 52-309.800.

Allen, William, to Burndy Corporation. Apparatus and process for installing IDC connectors onto a ribbon cable. 4,486,949, Cl. 29-861.000.

Alliance Europe S.A.: *See*—
Palmans, Jos, 4,487,586, Cl. 434-408.000.

Allibert S.A.: *See*—
Faucillon, Michel, 4,486,973, Cl. 43-100.000.

Allied Corporation: *See*—
Akkapeddi, Murali K., 4,487,920, Cl. 528-323.000.

Allison, Philip J.: *See*—
Simms, Gordon R.; Allison, Philip J.; and Benson, Cameron R., 4,487,565, Cl. 425-115.000.

Allsop, Inc.: *See*—
Allsop, Ivor J., 4,486,916, Cl. 15-246.000.

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Alna Koki Co., Ltd.: *See*—
Fujitsuka, Akira, 4,487,242, Cl. 160-102.000.

Alonso, Jorge H.: *See—*
Heady, Robert E.; and Alonso, Jorge H., 4,487,832, Cl. 435-135.000.
Alpia S.A.: *See—*
Bruneau, Alain, 4,486,956, Cl. 33-438.000.
Alps Electric Co. Ltd: *See—*
Fujiwara, Mitsugu; Aso, Tomio; Kurokawa, Koshiro; and Obara, Hideo, 4,488,159, Cl. 346-139.00R.
Alusik, Anthony A.: *See—*
Bernard, Richard A.; Alusik, Anthony A.; and Ananthamurthy, Bettadapur S., 4,487,636, Cl. 148-6.100.
Alyfuku, Kiyoshi: *See—*
Katsuma, Makoto; Alyfuku, Kiyoshi; Kawamura, Masaharu; Kiuchi, Masayoshi; and Murakami, Hiroyasu, 4,488,145, Cl. 340-384.00E.
Amano, Toshihiko: *See—*
Tatemoto, Masayoshi; and Amano, Toshihiko, 4,487,903, Cl. 526-247.000.
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Amcor Ltd.: *See—*
Yavnieli, Mordechai, 4,486,974, Cl. 43-112.000.
American Can Company: *See—*
Taylor, Frederick G.; and Casqueiro, Lawrence, 4,487,539, Cl. 413-55.000.
American District Telegraph Company: *See—*
Marsocci, Angelo A., 4,488,049, Cl. 250-574.000.
American Hoechst Corporation: *See—*
Coates, Stephen R.; and Binder, Walter L., 4,487,830, Cl. 435-7.000.
American Home Products Corporation: *See—*
Sarantakis, Dimitrios, 4,487,716, Cl. 260-112.50R.
American Maplan Corporation: *See—*
Ratheiser, Heinz, 4,487,508, Cl. 366-91.000.
American Standard Inc.: *See—*
Harmon, Kevin E., 4,488,207, Cl. 362-231.000.
American Sterilizer Company: *See—*
Monroe, Lawrence S., 4,487,523, Cl. 403-385.000.
Amiga Corporation: *See—*
Lee, Hugh M., 4,488,017, Cl. 200-5.00R.
AMP Incorporated: *See—*
Fedder, James L.; and Taylor, Attalee S., 4,487,468, Cl. 339-75.0MP.
Fukukura, Kazutoyo, 4,488,016, Cl. 200-5.00A.
Pegram, Warren J., 4,487,998, Cl. 174-153.00G.
Tomita, Akira, 4,487,992, Cl. 174-36.000.
Weidler, Charles H., 4,486,950, Cl. 29-866.000.
AMSTED Industries Incorporated: *See—*
Chiappetta, Ferdinand; Simpson, John H.; and Simpson, Neville H., 4,487,010, Cl. 57-213.000.
Analogic Corporation: *See—*
Wollman, Herbert, 4,488,144, Cl. 340-347.0DA.
Ananthamurthy, Bettadapur S.: *See—*
Bernard, Richard A.; Alusik, Anthony A.; and Ananthamurthy, Bettadapur S., 4,487,636, Cl. 148-6.100.
Anazawa, Norimichi; Okunuki, Masahiko; and Aihara, Ryuzo, to JEOL Ltd. Metal ion source. 4,488,045, Cl. 250-423.00R.
Anderson, Albert G.; and Howard, Edward G., Jr., to Du Pont de Nemours, E. I., and Company. Ethylene polymer composite heat storage material. 4,487,856, Cl. 523-205.000.
Anderson-Cook, Inc.: *See—*
Killop, James T., 4,487,047, Cl. 72-88.000.
Anderson, Elga, deceased (by Anderson, Margaret, personal representative), to Anderson, Margaret A. Hydraulic wood splitter with automatic cable hoist. 4,487,239, Cl. 144-193.00A.
Anderson, Margaret, personal representative: *See—*
Anderson, Elga, deceased, 4,487,239, Cl. 144-193.00A.
Anderson, Margaret A.: *See—*
Anderson, Elga, deceased, 4,487,239, Cl. 144-193.00A.
Anderson, Richard W.; and Asik, Joseph R. Plasma jet ignition system. 4,487,192, Cl. 123-654.000.
Andors, Derik K.: *See—*
Syme, Duncan C.; Caldwell, Eldon L.; Ferguson, Robert W.; Andors, Derik K.; and McLaughlin, Charles B., Jr., 4,487,195, Cl. 126-77.000.
Andrew, William G.: *See—*
Gillis, Joseph P.; and Andrew, William G., 4,487,266, Cl. 169-51.000.
Androphy, Gary W. Triplanar knee resection method. 4,487,203, Cl. 128-303.00R.
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Giroldini, William, 4,487,952, Cl. 560-24.000.
Anthony, Donald R., to Atlantic Richfield Company. Increasing the output of a pipeline anode. 4,487,230, Cl. 138-103.000.
Antonov, Veniamin V.; Bat, Jury I.; Gamalei, Edvin I.; Dolzhenkov, Fedor E.; Donskoi, Semen A.; Kulichenko, Valentin A.; Tischenko, Oleg I.; Shtepa, Evgeny D.; and Chervonenko, Viktor M., to Donetsky Nauchno-Issledovatelsky Institut Chernoi Metallurgii. Method for flame spraying of gunite on lining of metallurgical units. 4,487,397, Cl. 266-44.000.
Antson, Jorma O.: *See—*
Lindfors, Sven G.; Antson, Jorma O.; Graeffe, Ralf; Pakkala, Arto J.; and Suntola, Tuomo S., 4,488,084, Cl. 313-506.000.
Aoki, Naohisa; and Matuki, Akira, to Nippon Columbia Co., Ltd. Moving-coil type pickup cartridge. 4,488,284, Cl. 369-147.000.
Aoki, Nobuo; and Tamaki, Taro, to Kowa Company, Ltd. Peptides. 4,487,718, Cl. 260-112.50R.
Aoyagi, Yoshiaki: *See—*
Enomoto, Hiroshi; Nomura, Akira; Aoyagi, Yoshiaki; and Ueda, Fusao, 4,487,770, Cl. 424-249.000.
Aoyama, Nagara: *See—*
Koike, Masaru; Hasegawa, Yasumasa; Shimosaka, Satoru; Aoyama, Nagara; and Yoshizumi, Toshihiko, 4,486,963, Cl. 34-116.000.
Aoyama, Takahiko: *See—*
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Apache Chemicals, Inc.: *See—*
Jones, David E., 4,487,619, Cl. 62-3.000.
Appleby, Robert H.; and Cove, Peter L., to Titus Tool Company Limited. Joining device. 4,487,522, Cl. 403-231.000.
Applied Motion Products, Inc.: *See—*
MaCleod, Donald J., 4,488,076, Cl. 310-171.000.
APX Group, Inc.: *See—*
Hall, James R.; Harter, Donald P.; Clegg, Michael W.; and Gerber, James E., 4,486,932, Cl. 29-157.00R.
ARA, Inc.: *See—*
Mazelsky, Bernard, 4,487,383, Cl. 244-122.00R.
Arai, Noboru: *See—*
Sato, Masamichi; Arai, Noboru; Sunaga, Yasumasa; and Inuiya, Masafumi, 4,488,039, Cl. 250-216.000.
Arai, Norimasa: *See—*
Saito, Takashi; Uchida, Masayoshi; Mochizuki, Masafumi; and Arai, Norimasa, 4,488,286, Cl. 369-292.000.
Arai, Tomio: *See—*
Gomi, Shimpei; Arai, Tomio; Takeuchi, Tomomitsu; Miwa, Shigeru; Takatsuka, Toru; and Watari, Ryuzo, 4,487,686, Cl. 208-48.00R.
Arakawa, Susumu; Tsukigahora, Tooru; and Shirai, AKira, to Aisin Seiki Kabushikikaisha; and Toyota Jidoshakogyo. Reservoir having a level detector. 4,487,021, Cl. 60-534.000.
Aratani, Matsuhiko: *See—*
Kitaura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Aratani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; and Hashimoto, Masashi, 4,487,763, Cl. 424-177.000.
Archibald, James B.; and Rink, Frederick J., Jr., to General Electric Company. Generator stator frame with integral high-voltage bushings. 4,488,072, Cl. 310-71.000.
Arena, Alan J.: *See—*
Pounder, Edwin; Arena, Alan J.; Pawlowski, Michael; and Totten, Adrian M., 4,487,333, Cl. 222-54.000.
Arena, Blaise J., to UOP Inc. Method for hydrogenating aqueous solutions of carbohydrates. 4,487,980, Cl. 568-863.000.
Arendt, Ronald H., to General Electric Company. Preparation of large crystal sized barium and/or strontium titanate powder. 4,487,755, Cl. 423-598.000.
Aristoff, Paul A., to Upjohn Company, The. 9-Substituted carbacyclin analoga. 4,487,961, Cl. 562-501.000.
Armbruster, David R.; and Rodriguez, Luis R., to Acme Resin Corporation. Foundry core compositions. 4,487,868, Cl. 524-44.000.
Armco, Inc.: *See—*
Crawford, Richard A., 4,487,222, Cl. 137-516.290.
Armstrong World Industries, Inc.: *See—*
Haines, Charles, Jr.; and Kent, Raymond C., 4,487,793, Cl. 428-136.000.
Arnason, John D.; and Hampton, Michael J., to Schlumberger Canada Limited. Register position sensing and controlling apparatus. 4,488,152, Cl. 340-870.370.
Arndt, Otto; and Papenfuhs, Theodor, to Hoechst Aktiengesellschaft. Process for the preparation of N-acetylaminoarylsulfonic acids in sulfuric acid as solvent. 4,487,725, Cl. 260-507.00R.
Arnesson, Joel C. E.: *See—*
Scott, William B.; Dickinson, Daniel C.; and Arnesson, Joel C. E., 4,486,941, Cl. 29-568.000.
Arnett, James C.: *See—*
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Arnold, Herbert: *See—*
Horbelt, Michael; and Arnold, Herbert, 4,487,189, Cl. 123-491.000.
Arnould, Francois: *See—*
Barraud, Jean-Yves; Tourillon, Gerard; and Arnould, Francois, 4,487,661, Cl. 204-1.00T.
Aronson, Herbert L.; Wingate, Sidney A.; Cotter, William L.; and Brisk, Richard A., to Dynamics Research Corporation. Two dimensional press brake control system and apparatus. 4,488,237, Cl. 364-476.000.
Asahi Glass Company Ltd.: *See—*
Yamabe, Masaaki; Kojima, Gen; and Akiyama, Katsuyuki, 4,487,893, Cl. 525-386.000.
Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Nakajima, Nobuhiro; and Ibata, Jyoji, 4,487,875, Cl. 524-385.000.
Shimizu, Atsushi; and Yamataka, Kazunori, 4,487,752, Cl. 423-507.000.
Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Hisada, Masaharu, 4,487,485, Cl. 350-459.000.
Itoh, Takayuki; and Hama, Yoshihiro, 4,487,482, Cl. 350-429.000.
Kimata, Hiroshi; and Morizumi, Masaaki, 4,487,495, Cl. 354-403.000.
Asakawa, Kazuo: *See—*
Tabata, Fumio; Asakawa, Kazuo; and Komoriya, Hitoshi, 4,488,242, Cl. 364-513.000.

Asano, Eiji, to Minolta Camera Kabushiki Kaisha. Light beam scanning apparatus. 4,487,472, Cl. 350-3.710.
Ascarelli, Paolo; Boccalon, Gianfranco; Moretti, Giuliano; Nistico', Nicola; and Pelacani, Alberto, to Enoxy Chimica S.p.A. Thermoplastic compositions based on non-polar organic polymers and zeolites in acid form; which have strong adhesion to metals, and composite objects obtainable therefrom. 4,487,810, Cl. 428-461.000.
Asik, Joseph R.: *See*—
Anderson, Richard W.; and Asik, Joseph R., 4,487,192, Cl. 123-654.000.
Askeroth, Torbjorn: *See*—
Planten, Staffan; and Askeroth, Torbjorn, 4,486,914, Cl. 15-167.00A.
Aso, Tomio: *See*—
Fujiwara, Mitsugu; Aso, Tomio; Kurokawa, Koshiro; and Obara, Hideo, 4,488,159, Cl. 346-139.00R.
Astley, Vivian C.; and Taravella, Jody J., to Freeport Minerals Company. Stabilization of wet process phosphoric acid. 4,487,750, Cl. 423-321.00R.
Astra Meditec Aktiebolag: *See*—
Lambert, Hans R., 4,487,808, Cl. 428-423.100.
Astrand, Harald V. G., to Irvin Fallskarms AB. Parachute canopy. 4,487,384, Cl. 244-152.000.
AT&T Bell Laboratories: *See*—
Ahamed, Syed V., 4,488,302, Cl. 371-40.000.
Bogart, Frank J.; Dedisse, Mary R.; Divakaruni, Radhakrishna S.; Fette, Charles J.; Knight, Keith S.; Page, Karen L.; and Paxton, Thornton S., 4,488,004, Cl. 179-18.0AD.
Brown, Michael K.; and Rabiner, Lawrence R., 4,488,243, Cl. 364-513.500.
Christensen, Tore L.; Haygood, Gail L.; Spencer, Douglas A.; and Szymanski, Steven J., 4,488,294, Cl. 370-84.000.
Essig, Terrence L.; Huizinga, Donald D.; and Means, Donald R., 4,488,006, Cl. 179-81.00R.
Grimes, Gary J., 4,488,218, Cl. 364-200.000.
Harrison, Marc L., 4,488,229, Cl. 364-200.000.
Harrison, Marc L., 4,488,230, Cl. 364-200.000.
Harrison, Marc L., 4,488,267, Cl. 365-201.000.
Harrison, Thomas R.; and Tien, Ping K., 4,488,038, Cl. 250-211.00J.
Kazarinov, Rudolf F.; and Laryi, Sergey, 4,488,164, Cl. 357-27.000.
Kirschenbaum, Bernard, 4,487,464, Cl. 339-19.000.
Netravali, Arun N., 4,488,175, Cl. 358-136.000.
Seibel, Richard R., 4,488,002, Cl. 179-2.0DP.
Sharper, Craig A., 4,488,295, Cl. 370-99.000.
Shoji, Masakazu, 4,488,066, Cl. 307-452.000.
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Turner, Jonathan S., 4,488,289, Cl. 370-60.000.
AT&T Technologies, Inc.: *See*—
Bohannon, William D., Jr.; and Kinard, Michael D., 4,487,641, Cl. 156-54.000.
Hladovcak, Raymond C.; and Keating, Walter W., 4,487,828, Cl. 430-313.000.
Widdowson, Arnold B., 4,488,111, Cl. 324-158.00F.
Atchisson, Maxwell G. Drum magazine. 4,487,103, Cl. 89-33.020.
Atlantic Richfield Company: *See*—
Anthony, Donald K., 4,487,230, Cl. 138-103.000.
Miller, Richard F.; and Nicholson, Michael P., 4,487,981, Cl. 585-4.000.
Miller, Richard F.; and Nicholson, Michael P., 4,487,982, Cl. 585-4.000.
Wakefield, G. Felix; Arnett, James C.; and Yoo, Henry I., 4,487,989, Cl. 136-256.000.
Atlas Copco Aktibolag: *See*—
Skogberg, Bo T., 4,487,528, Cl. 405-259.000.
Atlas Pacific Engineering Company: *See*—
Meissner, Konrad E.; and Quay, Marvin F., 4,487,307, Cl. 198-394.000.
Atmosphere Furnace Company: *See*—
Lincoln, Joseph A.; and Keough, William A., 4,487,398, Cl. 266-120.000.
Atobe, Masaaki: *See*—
Yamamoto, Kazuhiro; and Atobe, Masaaki, 4,488,296, Cl. 370-104.000.
Atwood, John G.: *See*—
Helms, Charles C.; and Atwood, John G., 4,487,477, Cl. 350-172.000.
Auer, Robert E., to Coulter Corporation. Method of and apparatus for detecting change in the breakoff point in a droplet generation system. 4,487,320, Cl. 209-3.100.
Aulbert, Heinz G.: *See*—
Johanning, Hermann; and Aulbert, Heinz G., 4,487,542, Cl. 414-292.000.
Autoclave Engineers: *See*—
Ruyak, Robert F.; Silver, Theodore R.; and Tomasino, Rocco J., 4,487,557, Cl. 417-420.000.
Automotive Products plc: *See*—
Young, Alastair J., 4,487,304, Cl. 192-85.00R.
Axia Incorporated: *See*—
Hiltner, Andrew J., 4,487,143, Cl. 112-256.000.
Axmear, Frederick E.; Baxter, Duane W.; Saxman, John H.; and Siverling, Michael M., to International Business Machines Corporation. Sector servo seek control. 4,488,189, Cl. 360-78.000.
Azuma, Tadashi, to Fujimori Kogyo Co., Ltd. Tube assembly for integrated circuits. 4,487,315, Cl. 206-334.000.
B. F. Goodrich Company, The: *See*—
Traynor, Lee, 4,487,667, Cl. 204-59.00R.
White, Donald E., 4,487,999, Cl. 526-74.000.
Babcock-Brown Boveri Reaktor GmbH: *See*—
Stiefel, Max; and Wolfbeiss, Erich, 4,487,740, Cl. 376-256.000.
Babcock-Hitachi Kabushiki Kaisha: *See*—
Kuroda, Hiroshi; Nishimura, Tsukasa; Hashimoto, Taiki; Nishimura, Masakatsu; Kanda, Osamu; and Nozawa, Shigeru, 4,487,784, Cl. 423-555.000.
Babcock & Wilcox Company, The: *See*—
Agarwal, Suresh C., 4,488,239, Cl. 364-500.000.
Britt, James M.; LaPrade, Steve A.; and Martin, John T., 4,487,631, Cl. 106-80.000.
Haller, Kurt H.; Lieb, Carl; and Todoroff, Pete G., 4,487,166, Cl. 122-406.0ST.
Baglioni, Alessandro, to Medosan Industrie Biochimiche Riunite, S.p.A. C-3 Substituted 1,4-benzodiazepines and pharmaceutical utilization thereof. 4,487,771, Cl. 424-244.000.
Bahder, George, to Cable Technology Laboratories, Ltd. Electrical cable joint structure and method of manufacture. 4,487,994, Cl. 174-73.00R.
Bahr, Gunter F.; and Schell, Barry E., to United States of America, Army. Tomographic marking device. 4,488,043, Cl. 250-311.000.
Baier, Erich; Koefferlein, Rainer; and Schlageter, Bernhard, to Siemens Aktiengesellschaft. Device for adjusting the level of a developing mixture, which consists of a toner and carrier particles, on a developing roller. 4,487,496, Cl. 355-3.0DD.
Baik, Sunggi: *See*—
Raj, Rishi; and Baik, Sunggi, 4,487,840, Cl. 501-97.000.
Bailly, Jean C.; and Collomb, Joelle, to BP Chimie Society Anonyme. Process for the preparation of catalyst supports for the polymerization of alpha-olefins and the supports obtained. 4,487,846, Cl. 502-154.000.
Baird, Phillips C.; and Greenspan, Jay S., to Isotronics, Inc. Microwave chip carrier. 4,487,999, Cl. 174-52.00S.
Baitz, Gunter: *See*—
Rubey, Wolfgang; Baitz, Gunter; Malke, Wolfgang; and Noack, Harald, 4,487,519, Cl. 400-534.000.
Bajulaz, Roger. Machine having oscillating chambers and pistons. 4,487,168, Cl. 123-18.00R.
Baker, Edward B., to Martin Marietta Corporation. Alignment error calibrator and compensator. 4,488,249, Cl. 364-571.000.
Bakonyi, Maria: *See*—
Szoke, Sandor; Lugosi, Gyorgy; Bakonyi, Maria; Ghyczy, Jeno ; and Csermely, Gyorgy, 4,487,936, Cl. 548-139.000.
Balazs, Endre A.; Wedlock, David J.; and Phillips, Glyn O., to Biomatrix, Inc. Polymeric articles modified with hyaluronate. 4,487,865, Cl. 524-29.000.
Baldwin, LeRoy A., to Xerox Corporation. Trail edge copy registration system. 4,487,407, Cl. 271-233.000.
Ball, Anthony F., to Tinsley Wire (Sheffield) Limited. Metal reinforcing strips. 4,487,000, Cl. 52-660.000.
Ballato, Joseph F., Jr. Packing material for contacting towers. 4,487,727, Cl. 261-94.000.
Ballreich, Heinz: *See*—
Noetzel, Siegfried; Scholl, Margarete; and Ballreich, Heinz, 4,487,655, Cl. 162-5.000.
Baluteau, Jean-Michel: *See*—
Grandjacques, Benoit; Moirez, Jacques; Saint-Sevin, Michel; Blot, Michel; and Baluteau, Jean-Michel, 4,487,503, Cl. 356-136.000.
Balzers Aktiengesellschaft: *See*—
Mennenga, Hermann, 4,487,058, Cl. 73-40.700.
Ban, Yasutaka: *See*—
Yasuda, Hiroshi; and Ban, Yasutaka, 4,487,795, Cl. 428-138.000.
Bandini, Arthur L.: *See*—
Haussmann, Robert H.; Cohen, Stuart B.; and Bandini, Arthur L., 4,488,293, Cl. 370-84.000.
Bano'k Co., Ltd.: *See*—
Ueno, Hideyuki, 4,487,354, Cl. 227-67.000.
Barber-Colman Company: *See*—
Johnson, Stuart J.; and Fransson, George E., 4,487,535, Cl. 409-60.000.
Barker, James E.; and Hadley, James C., to General Signal Corporation. Valve seal for fire safe or high temperature valves. 4,487,216, Cl. 137-74.000.
Barmenkova, Natalia V.: *See*—
Biseniex, Egils A.; Veveris, Maris M.; Dubur, Gunar Y.; Polis, Yanis J.; Uldrikis, Yan R.; Barmenkova, Natalia V.; and Kimenis, Agris A., 4,487,932, Cl. 546-285.000.
Barna, Alex J. Punching tool having interchangeable punches. 4,487,566, Cl. 425-193.000.
Barnes, John W.: *See*—
O'Brien, Harold A., Jr.; Barnes, John W.; Taylor, Wayne A.; Thomas, Kenneth E.; and Bentley, Glenn E., 4,487,738, Cl. 376-192.000.
Barrash, Marshall J., to Coca-Cola Company, The. Corrugated cardboard container having a paperboard top and handle. 4,487,319, Cl. 206-602.000.
Barraud, Jean-Yves; Tourillon, Gerard; and Arnould, Francois, to Compagnie Generale D'Electricite. Method and device for determining the physical characteristics of a semiconductor material. 4,487,661, Cl. 204-1.00T.
Barstow, James H. Method and apparatus for processing brush cuttings. 4,487,120, Cl. 100-40.000.
Barton, John M., to National Research Development Corporation. Curing agents for epoxy resins. 4,487,914, Cl. 528-92.000.
Barton Valve Company, Inc.: *See*—
Eagen, Duane M., 4,487,393, Cl. 251-328.000.

Bartuska, Miloslav; Kroupa, Petr; Szabo, Josef; and Zverina, Karel, to Vysoka skola chemicko-technologicka. Material for plasma spraying and method of making same. 4,487,841, Cl. 501-105.000.

Bartz, Kenneth W., to Exxon Research & Engineering Co. UV Stabilizer system and UV stabilized polyolefins. 4,487,870, Cl. 524-91.000.

BASF Aktiengesellschaft: *See*—
Hagen, Karl; and Scholl, Karl H., 4,487,728, Cl. 264-23.000.
Himmele, Walter; Heberle, Wolfgang; Kohlmann, Friedrich-Wilhelm; and Wesenberg, Walter, 4,487,965, Cl. 564-454.000.
Krabetz, Richard; Merger, Franz; and Schwarzmann, Matthias, 4,487,962, Cl. 562-534.000.

BASF Wyandotte Corporation: *See*—
Hartman, Robert J., 4,487,854, Cl. 521-174.000.
Reichel, Curtis J.; Levis, William W., Jr.; and Pizzini, Louis C., 4,487,853, Cl. 521-172.000.
Wilson, Joe C.; and Davis, Pauls, 4,487,712, Cl. 252-78.300.

Basire, Dominique; Bhattacharyya, Arup; Howard, James K.; and Mollier, Pierre, to International Business Machines Corporation. Electronically programmable read only memory. 4,488,262, Cl. 365-104.000.

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Korshunov, Evgeny A.; Kuznetsov, Alexandr N.; Ovodenko, Maxim B.; Kuzmin, Gennady G.; Kostrov, Valery P.; Timofeev, Alexandr N.; Bastrikov, Valery L.; and Meschaninova, Tatyana V., 4,487,250, Cl. 164-473.000.

Bat, Jury I.: *See*—
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Bates, James S., to Sprague Electric Company. Electrolytically forming a lot of valve-metal-bodies for use in capacitors. 4,487,666, Cl. 204-56.00R.

Bates, William G.: *See*—
Gottschlich, Chad F.; Roblee, Leland H. S., Jr.; Seemann, Howard H.; Bates, William G.; and Spahr, Richard F., 4,487,573, Cl. 431-348.000.

Battigelli, Jean A.; and Berthier, Guy, to Isover Saint-Gobain. Method and apparatus for forming fiber webs. 4,487,622, Cl. 65-4.400.

Bauch, Tamil D. Removable window insulation system. 4,486,990, Cl. 52-202.000.

Baudot, Jean-Jacques, to Societe Anonyme de Telecommunications. Device for measuring the coordinates of a rotating sphere and process for manufacturing part of this device. 4,488,041, Cl. 250-231.0GY.

Bauer, Kurt; Hesch, Georg; Huber, Hans; Markert, Helmut; and Roth, Christian, to ITT Industries, Inc. Windshield wiper yoke. 4,487,053, Cl. 72-335.000.

Bauich, Donald L.: *See*—
Campbell, Ian M.; Bauich, Donald L.; and Chappel, Jonathan M., 4,487,988, Cl. 568-943.000.

Baumann, Rainer, to Honeywell G.m.b.H. Piezoelectrical control element. 4,488,080, Cl. 310-328.000.

Bauriedel, Hans, to Henkel Kommanditgesellschaft auf Aktien. Process for polyurethane prepolymers containing terminal isocyanate groups and having a reduced residual monomer content. 4,487,910, Cl. 528-65.000.

Baxter, Duane W.: *See*—
Axmear, Frederick E.; Baxter, Duane W.; Saxman, John H.; and Siverling, Michael M., 4,488,189, Cl. 360-78.000.

Bayer Aktiengesellschaft: *See*—
Elbe, Hans-Ludwig; Jautelat, Manfred; Buchel, Karl H.; Schaller, Klaus; and Plempel, Manfred, 4,487,776, Cl. 424-269.000.
Fiedler, Paul; and Braden, Rudolf, 4,487,966, Cl. 564-454.000.
Grohe, Klaus; and Paul, Volker, 4,487,783, Cl. 424-322.000.
Heitz, Walter; and Risse, Wilhelm, 4,487,918, Cl. 528-212.000.
Idel, Karsten; Freitag, Dieter; and Ostlinning, Edgar, 4,487,698, Cl. 210-639.000.
Kniege, Wilfried; Michel, Werner; Ackermann, Jurgen; and Rudolph, Karl-Heinz, 4,487,906, Cl. 528-15.000.
Richter, Roland; Muller, Hanns P.; and Wagner, Kuno, 4,487,928, Cl. 544-193.000.

Bayne, Brian. Check resisting and reinforcing insert for wood pole ends. 4,486,999, Cl. 52-514.000.

BBC Brown, Boveri & Company, Limited: *See*—
Furrer, Andreas; Mertl, Vaclau; Milavec, Johann; and Stemmler, Herbert, 4,488,121, Cl. 330-10.000.
Haase, Werner; and Mayer, Andreas, 4,487,552, Cl. 417-64.000.
Mares, Otakar; and Ritter, Urs, 4,487,436, Cl. 285-228.000.

BBC Industries, Inc.: *See*—
Brown, Claude D., 4,487,361, Cl. 236-11.000.

Beard, Steven A.: *See*—
Carlin, John A.; Mesch, William G.; Thompson, Randall D.; Beard, Steven A.; and Stephens, Tracy R., 4,487,065, Cl. 73-290.00V.

Beavers, William A., to Eastman Kodak Company; and Eastman Kodak Company. Catalytic process for the preparation of tetrahydropyran by homologation of tetrahydrofuran. 4,487,943, Cl. 549-356.000.

Beck, Raymond L., Jr., to Union Carbide Corporation. Device for use in making encapsulated chip capacitor assemblies. 4,488,204, Cl. 361-433.000.

Becker, Charles A., to General Electric Company. High density electronic circuits having very narrow conductors. 4,487,993, Cl. 174-68.500.

Becker, James F.; and Mayer, Andrew S. Children's books. 4,487,590, Cl. 446-147.000.

Becker, Manfred, to Deere & Company. Bushing assembly for preloading a thrust bearing. 4,487,460, Cl. 384-620.000.

Beckman Instruments, Inc.: *See*—
Brown, James R.; and Aday, Roy W., Jr., 4,488,051, Cl. 250-561.000.

Beckway, Bruce C., to Packaging Materials Corporation. Pallet leg for a corrugated cardboard pallet. 4,487,136, Cl. 108-51.300.

Beckwith, Peter J.: *See*—
McLeary, Ross C.; and Beckwith, Peter J., 4,488,310, Cl. 372-58.000.

Becton, Dickinson and Company: *See*—
Kapadia, Nikul S.; and Ray, David J., 4,488,240, Cl. 364-508.000.
Kuciera, Joachim, 4,488,148, Cl. 340-700.000.
Leviton, Jan L.; and Meisch, Charles E., 4,487,606, Cl. 604-319.000.

Beijer, Gene, to Adams Rite Products, Inc. Aircraft door bolt actuating mechanism. 4,487,440, Cl. 292-336.300.

Beke, Steven J. Automatic barbecue-grille cleaner. 4,486,911, Cl. 15-21.00R.

Belcher, Samuel L.: *See*—
Wiatt, James G.; Calvert, James W.; Belcher, Samuel L.; and Smith, Roger D., 4,487,568, Cl. 425-534.000.

Belko, Robert P.: *See*—
Sprecker, Mark A.; Klemarczyk, Philip T.; and Belko, Robert P., 4,487,701, Cl. 252-8.600.

Bell, William D.: *See*—
Patel, Shantilal G.; and Bell, William D., 4,487,040, Cl. 66-195.000.

Bellanger, Gilbert; and Giroux, Pierre, to Commissariat a l'Energie Atomique. Process for treating solutions containing tritiated water. 4,487,670, Cl. 204-129.000.

Belling, Alexandr: *See*—
Malek, Zdenek; Jelinek, Stanislav; Belling, Alexandr; Matena, Vladimir; and Jelinek, Jan, 4,487,253, Cl. 165-11.00R.

Bellus, Daniel: *See*—
Zweifel, Hans; Schilling, Walter; Storni, Angelo; and Bellus, Daniel, 4,487,942, Cl. 549-236.600.

Beloit Corporation: *See*—
Wedel, Gregory L., 4,486,962, Cl. 34-110.000.

Bemmerl, Hans-Ferdinand: *See*—
Nerlich, Ernst-Gunter; Bemmerl, Hans-Ferdinand; and Kroninger, Peter, 4,487,531, Cl. 405-291.000.

Ben Clements & Sons, Inc.: *See*—
Ueno, Hideyuki, 4,487,354, Cl. 227-67.000.

Benckiser-Knapsack GmbH: *See*—
Noetzel, Siegfried; Scholl, Margarete; and Ballreich, Heinz, 4,487,655, Cl. 162-5.000.

Bendig, Franz; and Bendig, Johannes. Method and device for producing interlocked stacks of bags made of hose-like thermoplastic foil. 4,487,599, Cl. 493-194.000.

Bendig, Johannes: *See*—
Bendig, Franz; and Bendig, Johannes, 4,487,599, Cl. 493-194.000.

Bendix Corporation, The: *See*—
Dienes, Larry E.; Knight, David J.; and Wurst, William R., 4,487,617, Cl. 55-163.000.
Hammond, Robert J., 4,487,300, Cl. 188-378.000.
Harrison, Gregory K., 4,487,105, Cl. 91-369.00A.
Knapp, Anthony W.; and Shepler, Eric F., 4,487,470, Cl. 339-89.00M.
Kytta, Oswald O., 4,487,022, Cl. 60-547.100.
Roberts, James K., 4,487,298, Cl. 188-79.5GE.
Schreiner, Peter J.; and Gumkowski, Bert A., 4,487,296, Cl. 188-73.380.

Beningfield, Harley W.: *See*—
Treise, Jan E.; and Beningfield, Harley W., 4,488,108, Cl. 324-83.00D.

Benoit-Gonin, Roger; Berger, Jean L.; and Coutures, Jean L., to Thomson-CSF. Device for current-reading of a quantity of electric charges and a charge-transfer filter equipped with said device. 4,488,129, Cl. 333-165.000.

Benson, Cameron R.: *See*—
Simms, Gordon R.; Allison, Philip J.; and Benson, Cameron R., 4,487,565, Cl. 425-115.000.

Benson, John; Hanel, Harold L.; and Freeman, Douglas A., to International Telephone and Telegraph Corporation. Powder actuated tool. 4,487,353, Cl. 227-9.000.

Bentley, Glenn E.: *See*—
O'Brien, Harold A., Jr.; Barnes, John W.; Taylor, Wayne A.; Thomas, Kenneth E.; and Bentley, Glenn E., 4,487,738, Cl. 376-192.000.

Berg, Dennis G., to Winfred M. Berg, Inc. Flexible Coupling. 4,487,591, Cl. 464-85.000.

Berg, Thomas E.; and Pollard, Christopher A., to Magnetic Peripherals Inc. Two axis linear motor for optical focusing and tracking system in optical recording. 4,488,095, Cl. 318-38.000.

Berger, Antoine; and Gibert, Francois, to Centre Stephanois De Recherches Mecaniques Hydromecanique et Frottement. Hydraulic machine with retractable partitions and variable cubic capacity. 4,487,559, Cl. 418-25.000.

Berger, Jean L.: *See*—
Benoit-Gonin, Roger; Berger, Jean L.; and Coutures, Jean L., 4,488,129, Cl. 333-165.000.

Bergeron, Norman J.; Boozan, Dean A.; and Hazelett, R. William, to Hazelett Strip-Casting Corporation. Machine for producing insulative and protective coatings on endless flexible metallic belts of continuous casting machines. 4,487,157, Cl. 118-59.000.

Bergeron, Norman J.; Boozan, Dean A.; and Brennan, Thomas E., to Hazelett Strip-Casting Corporation. Laterally floating thermal spray

gun traversing apparatus and system for laterally tracking a revolving casting belt being thermal spray coated. 4,487,790, Cl. 427-422.000.

Berghaeuser, Gunter, to Hoechst Aktiengesellschaft. Process for the burning-in of light-sensitive layers during the preparation of printing forms. 4,487,827, Cl. 430-302.000.

Bergler, Otto, to Eugen Lutz GmbH & Co Maschinenfabrik. Blade holding means for cutter spindles or cutter heads. 4,487,240, Cl. 144-230.000.

Berke, Philip A.; and Rosen, William E., to Sutton Laboratories, Inc. N-(hydroxymethyl)-N-(1,3-dihydroxymethyl-2,5-dioxo-4-imidazolidinyl)-N'-(hydroxymethyl)urea. 4,487,939, Cl. 548-311.000.

Bermudez, Mauricio; and Torres, Alberto L., to Dow Chemical Company, The. Modified carbohydrate polymers. 4,487,864, Cl. 524-2.000.

Bernard, Richard A.; Alusik, Anthony A.; and Ananthamurthy, Bettadapur S., to Pitney Bowes Inc. Color coding of powder metal parts. 4,487,636, Cl. 148-6.100.

Bernardin, Sarah A. Fold and hold answer book. 4,487,430, Cl. 281-29.000.

Bernstein, Karl. Nuclear radiation measuring apparatus and method. 4,488,046, Cl. 250-474.100.

Bertelsen, Paul: *See*—
Stewart, James B.; and Bertelsen, Paul, 4,486,915, Cl. 15-187.000.

Berthier, Guy: *See*—
Battigelli, Jean A.; and Berthier, Guy, 4,487,622, Cl. 65-4.400.

Bethlehem Steel Corporation: *See*—
Gheen, William E.; and Wei, Millet L., 4,487,400, Cl. 266-193.000.

Better Wire Products, Inc.: *See*—
Sandersos, Robert C., 4,487,317, Cl. 206-509.000.

Betz Laboratories, Inc.: *See*—
Muccitelli, John A., 4,487,708, Cl. 252-178.000.

Bhatnagar, Pradip K.: *See*—
Nitecki, Danute E.; and Bhatnagar, Pradip K., 4,487,715, Cl. 260-112.50R.

Bhattacharyya, Arup: *See*—
Basire, Dominique; Bhattacharyya, Arup; Howard, James K.; and Mollier, Pierre, 4,488,262, Cl. 365-104.000.

Bianchetta, Donald L.; and White, Robert W., to Caterpillar Tractor Co. Control for a fluid-driven fan. 4,487,255, Cl. 165-39.000.

Bianchi, Nereo, to NECCHI Societa per Azioni. Sewing machine pivotable work support. 4,487,144, Cl. 112-260.000.

BICC Public Limited Company: *See*—
Ditchfield, Neville J., 4,487,997, Cl. 174-115.000.

Bienek, Heinz; von Heesen, Wolfgang; and Wick, Wilhelm, to Steag Kernenergie GmbH. Container for the storage of radioactive material. 4,488,048, Cl. 250-506.100.

Bilezikian, Edward S.: *See*—
Gonce, William P.; and Bilezikian, Edward S., 4,486,904, Cl. 2-312.000.

Billen, Kurt, to Electrolux S.a.r.l. Refrigerator door. 4,486,981, Cl. 49-501.000.

Biller, Dieter, to REPA Feinstanzwerk, GmbH. Anchorage for the belt latch of a safety belt. 4,487,454, Cl. 297-468.000.

Binder, Paul; and Cane, David A., to Digital Equipment Corporation. Data processing system with lock-unlock instruction facility. 4,488,217, Cl. 364-200.000.

Binder, Walter L.: *See*—
Coates, Stephen R.; and Binder, Walter L., 4,487,830, Cl. 435-7.000.

Bindernagel, Ali: *See*—
Faste, Heinrich; and Bindernagel, Ali, 4,487,247, Cl. 164-126.000.

Biolectron, Inc.: *See*—
Brighton, Carl T., 4,487,834, Cl. 435-173.000.

Biomatrix, Inc.: *See*—
Balazs, Endre A.; Wedlock, David J.; and Phillips, Glyn O., 4,487,865, Cl. 524-29.000.

Biseniex, Egils A.; Veveris, Maris M.; Dubur, Gunar Y.; Polis, Yanis J.; Uldrikis, Yan R.; Barmenkova, Natalia V.; and Kimenis, Agris A., to Institut Organicheskogo Sinteza Akademii Nauk Latviiskoi. 2,6-Dimethyl-3,5-bis-(1-adamantylhydroxycarbonyl)-4-(2-difluoromethoxyphenyl)-1,4-dihydropyridine. 4,487,932, Cl. 546-285.000.

Bjork, Hilmer, to Aktiebolaget Bofors. Mounting socket for a proximity switch. 4,487,469, Cl. 339-88.00R.

Bjorling, Gotthard, to SKF Steel Engineering Aktiebolag. Selective reduction of heavy metals. 4,487,628, Cl. 75-10.00R.

Black & Decker Inc.: *See*—
Huber, Siefried, 4,487,270, Cl. 173-12.000.

Blackburn, James R.; and Gentes, James J. Pannier carrier for bicycles. 4,487,344, Cl. 224-39.000.

Blankenship, Larry K.: *See*—
Brucker, Stephen E.; and Blankenship, Larry K., 4,487,583, Cl. 434-22.000.

Blaser & Translift Gesellschaft Fur Hebe-Und Forderanlagen mbH: *See*—
Geng, Manfred, 4,488,015, Cl. 191-45.00A.

Bleicher, Manfred; Schmid, Wolfgang; and Wanner, Karl, to Robert Bosch GmbH. Impacting drill. 4,487,272, Cl. 173-48.000.

Bliss, George N., to Diamond Automations, Inc. Article coding and separating system. 4,487,321, Cl. 209-510.000.

Bloomer, Milton D., to General Electric Company. Protection circuit for capacitive ballast. 4,488,199, Cl. 361-93.000.

Blot, Michel: *See*—
Grandjacques, Benoit; Moirez, Jacques; Saint-Sevin, Michel; Blot, Michel; and Baluteau, Jean-Michel, 4,487,503, Cl. 356-136.000.

Bluzer, Nathan; Turley, Alfred P.; Kub, Francis J.; and Borsuk, Gerald M., to Westinghouse Electric Corp. Highly isolated photodetectors. 4,488,163, Cl. 357-24.000.

Boccalon, Gianfranco: *See*—
Ascarelli, Paolo; Boccalon, Gianfranco; Moretti, Giuliano; Nistico', Nicola; and Pelacani, Alberto, 4,487,810, Cl. 428-461.000.

Bochumer Eisenhutte Heintzmann GmbH & Co. KG: *See*—
Nerlich, Ernst-Gunter; Bemmerl, Hans-Ferdinand; and Kroninger, Peter, 4,487,531, Cl. 405-291.000.

Bock, Mark G.; and DiPardo, Robert M., to Merck & Co., Inc. Enantioselective synthesis of 4-amino-3-hydroxy-2,4-(disubstituted)pentanoic acid. 4,487,963, Cl. 562-567.000.

Bodine, Albert G. Sonic pump for pumping wells and the like employing a rod vibration system. 4,487,554, Cl. 417-241.000.

Boenning, Robert A.: *See*—
Nasuta, Anthony T.; Boenning, Robert A.; and Kraus, Mark G., 4,488,301, Cl. 371-25.000.

Bogart, Frank J.; Dedisse, Mary R.; Divakaruni, Radhakrishna S.; Fette, Charles J.; Knight, Keith S.; Page, Karen L.; and Paxton, Thornton S., to AT&T Bell Laboratories. Providing feature transparency between a plurality of PBXs. 4,488,004, Cl. 179-18.0AD.

Boginsky, Vladimir P.: *See*—
Smolyanitsky, Boris N.; Boginsky, Vladimir P.; Gileta, Vladimir P.; Syryamin, Jury N.; and Terskov, Alexei D., 4,487,273, Cl. 173-55.000.

Bohannon, William D., Jr.; and Kinard, Michael D., to AT&T Technologies, Inc. Methods of and apparatus for making a rodent and lighting protective cable sheath system. 4,487,641, Cl. 156-54.000.

Bohnke, Botho; and Diering, Bernd, to Bohnke, Botho. Biological waste-water-treatment method. 4,487,697, Cl. 210-605.000.

Boileau, Jacques; Emeury, Jean-Marie L.; and Kehren, Jean-Paul, to Societe Nationale des Poudres et Explosifs. Tetranitroglycoluril and method of preparation thereof. 4,487,938, Cl. 548-304.000.

Bolick, Virgil T., Jr.: *See*—
Gentry, John M.; Bolick, Virgil T., Jr.; and Brownell, Kenneth W., Jr., 4,488,125, Cl. 333-1.000.

Bolton, Brent C.; Logsdon, Gary L.; Hagenmaier, Carl F., Jr.; and Wilson, Jesse R., to Burroughs Corporation. Arbiter switch for a concurrent network of processors. 4,488,151, Cl. 340-825.500.

Bonazoli, Robert: *See*—
Muzeroll, Martin E.; Bonazoli, Robert; Waymouth, John F.; and Karlotski, Robert J., 4,488,091, Cl. 315-268.000.

Bond, George L.; Cartman, Frank P.; and Ryan, Philip M., to International Business Machines Corporation. Multi-bit error scattering arrangement to provide fault tolerant semiconductor static memories. 4,488,298, Cl. 371-11.000.

Bond, John A.; Li, Yuan-Lu; and Crane, Leslie J., to Northern Telecom Limited. Method of and apparatus for modifying a video signal to inhibit recording thereof. 4,488,176, Cl. 358-141.000.

Bone, Rainer: *See*—
Boning, Bernward; Bone, Rainer; Nagel, Rudolf; and Sellmaier, Franz, 4,487,184, Cl. 123-425.000.

Bonerb, Timothy C., to Bonerb, Vincent C. Valve assembly and control system for material handling and storage bin. 4,487,335, Cl. 222-57.000.

Bonerb, Vincent C.: *See*—
Bonerb, Timothy C., 4,487,335, Cl. 222-57.000.

Boning, Bernward; Bone, Rainer; Nagel, Rudolf; and Sellmaier, Franz, to Robert Bosch GmbH. Control of an internal combustion engine with reference to a combustion chamber sensor. 4,487,184, Cl. 123-425.000.

Bookout, Russell J., to TRW Inc. Protection apparatus for liquid-filled submergible motors and the like. 4,487,299, Cl. 188-313.000.

Boozan, Dean A.: *See*—
Bergeron, Norman J.; Boozan, Dean A.; and Hazelett, R. William, 4,487,157, Cl. 118-59.000.
Bergeron, Norman J.; Boozan, Dean A.; and Brennan, Thomas E., 4,487,790, Cl. 427-422.000.

Borg-Warner Corporation: *See*—
Studtmann, George H., 4,488,101, Cl. 318-800.000.

Boron, Joseph J., to Midwest Instrument Co., Inc. Molten metal sampler for jominey test. 4,487,082, Cl. 73-864.550.

Borsuk, Gerald M.: *See*—
Bluzer, Nathan; Turley, Alfred P.; Kub, Francis J.; and Borsuk, Gerald M., 4,488,163, Cl. 357-24.000.

Boucher, Harry H.: *See*—
Stephens, Richard J.; and Boucher, Harry H., 4,488,034, Cl. 235-50.00A.

Boudakian, Max M., to Olin Corporation. Production of m-fluoroacetophenone. 4,487,969, Cl. 568-316.000.

Boudreau, Joseph A.: *See*—
Takemoto, George S.; and Boudreau, Joseph A., 4,487,872, Cl. 524-127.000.

Boueri, Elias T.; and Huntington, Dennis C., to Ford Motor Company. Automatic transmission start-up clutch control system. 4,487,303, Cl. 192-0.052.

Boyce, Raymond D. Portable blender. 4,487,509, Cl. 366-199.000.

Bozzuto, Carl R., to Combustion Engineering, Inc. Acetylene from coal and an electric arc. 4,487,683, Cl. 208-8.00R.

BP Chimie Society Anonyme: *See*—
Bailly, Jean C.; and Collomb, Joelle, 4,487,846, Cl. 502-154.000.

Braathen, Thor F. Three-stage temperature switch, preferably for a hot water heater. 4,488,138, Cl. 337-338.000.

Bradbury, Colin: *See*—
Dunn, James E.; Bradbury, Colin; Holmes, Kenneth R.; and Treadwell, Stephen W., 4,488,290, Cl. 370-66.000.

Braden, Rudolf: *See*—
Fiedler, Paul; and Braden, Rudolf, 4,487,966, Cl. 564-454.000.

Bradley, Jerome R.: *See*—
Hurst, Jeffrey B.; and Bradley, Jerome R., 4,487,220, Cl. 137-375.000.

Bradley, John J.: *See*—
Miu, Ming T.; and Bradley, John J., 4,488,227, Cl. 364-200.000.

Bradner, William T.: *See*—
Nettleton, Donald E., Jr.; Bush, James A.; Bradner, William T.; and Doyle, Terrence W., 4,487,925, Cl. 536-24.000.

Brand-Rex Company: *See*—
Gentry, John M.; Bolick, Virgil T., Jr.; and Brownell, Kenneth W., Jr., 4,488,125, Cl. 333-1.000.

Brandt, Manfred; and Kurmis, Viktor, to ERNO Raumfahrttechnik GmbH. Device for removing impurities from the surface of liquids. 4,487,694, Cl. 210-242.300.

Brattstrom, Leif; Hallstrom, Stig; Gustavsson, Bo; and Mattsson, K[illegible]ll, to AB Bofors. Hollow charge. 4,487,130, Cl. 102-476.000.

Brauer, Eric A., to RCA Corporation. Stylus lifter locking mechanism for video disc player. 4,488,285, Cl. 369-170.000.

Breglia, Denis R.: *See*—
Allen, John H.; Portoghese, Joseph; Hebb, Richard C.; and Breglia, Denis R., 4,487,584, Cl. 434-44.000.

Brennan, Michael E.; and Speranza, George P., to Texaco Inc. Modified Mannich condensates and manufacture of rigid polyurethane foam with alkoxylation products thereof. 4,487,852, Cl. 521-167.000.

Brennan, Thomas E.: *See*—
Bergeron, Norman J.; Boozan, Dean A.; and Brennan, Thomas E., 4,487,790, Cl. 427-422.000.

Bret, Antoine, to Commissariat a l'Energie Atomique. Fast neutron nuclear reactor with internal capillary structure piping. 4,487,742, Cl. 376-298.000.

Brice, Jean M., to Societe pour l'Etude et la Fabrication des Circuits Integres Speciaux. Integrated logic network with simplified programming. 4,488,246, Cl. 364-716.000.

Bridges, James R., to Halliburton Company. Pulsed neutron generator control circuit. 4,487,737, Cl. 376-119.000.

Bridgestone Tire Co., Ltd.: *See*—
Otsuori, Toshio; and Yamamoto, Mineo, 4,487,892, Cl. 525-237.000.

Briggs, Eugene C.: *See*—
Robertson, Wayne; Briggs, Eugene C.; and Briggs, Keith E., 4,487,571, Cl. 431-208.000.

Briggs, Keith E.: *See*—
Robertson, Wayne; Briggs, Eugene C.; and Briggs, Keith E., 4,487,571, Cl. 431-208.000.

Briggs, Peter J., to Matburn (Holdings) Limited. Closure device for bags or pouches. 4,486,923, Cl. 24-30.50R.

Brighton, Carl T., to Biolectron, Inc. Electrical stimulation of articular chondrocytes. 4,487,834, Cl. 435-173.000.

Brisk, Richard A.: *See*—
Aronson, Herbert L.; Wingate, Sidney A.; Cotter, William L.; and Brisk, Richard A., 4,488,237, Cl. 364-476.000.

Bristol-Myers Company: *See*—
Nettleton, Donald E., Jr.; Bush, James A.; Bradner, William T.; and Doyle, Terrence W., 4,487,925, Cl. 536-24.000.
Vyas, Dolatrai M.; Kaneko, Takushi; and Doyle, Terrence W., 4,487,769, Cl. 424-246.000.

British Gas Corporation: *See*—
Hebden, Dennis; and Brooks, Charles T., 4,487,612, Cl. 48-77.000.

British Petroleum Company, p.l.c.: *See*—
Heyward, Malcolm P.; and Young, Dennis, 4,487,851, Cl. 518-728.000.
Telford, Clive D.; and Young, Dennis, 4,487,843, Cl. 502-85.000.

British Steel Corporation: *See*—
Montgomery, Robert W.; and Garner, Henry C., 4,488,312, Cl. 373-93.000.

Britt, James M.; LaPrade, Steve A.; and Martin, John T., to Babcock & Wilcox Company, The. Shot-free millboard. 4,487,631, Cl. 106-80.000.

Britton, Kennith L.: *See*—
Tittes, Allan F.; Larson, Kenneth H.; Burton, Elmer E.; and Britton, Kennith L., 4,487,399, Cl. 266-158.000.

Brooks, Charles T.: *See*—
Hebden, Dennis; and Brooks, Charles T., 4,487,612, Cl. 48-77.000.

Brown, Boveri & Cie AG: *See*—
Cantarel, Pierre, 4,488,260, Cl. 365-49.000.
Neidig, Arno; Hettmann, Hubert; Leukel, Bernd; and Rief, Rolf, 4,488,167, Cl. 357-74.000.

Brown, Claude D., to BBC Industries, Inc. Heat exchanger flame control. 4,487,361, Cl. 236-11.000.

Brown, James R.; and Aday, Roy W., Jr., to Beckman Instruments, Inc. Apparatus for sensing linear and rotational position between a screw element and a threaded member. 4,488,051, Cl. 250-561.000.

Brown, Michael K.; and Rabiner, Lawrence R., to AT&T Bell Laboratories. Dynamic time warping arrangement. 4,488,243, Cl. 364-513.500.

Brown, William D.; and Veta, Ross E., to Rohr Industries, Inc. Methods and means for maintaining electrical isolation of dissimilar metals when cutting or drilling is required. 4,487,794, Cl. 428-137.000.

Brownell, Kenneth W., Jr.: *See*—
Gentry, John M.; Bolick, Virgil T., Jr.; and Brownell, Kenneth W., Jr., 4,488,125, Cl. 333-1.000.

Brownlie, Alan W.; and Spier, Roger D. Adjustable suction device for medical use. 4,487,600, Cl. 604-35.000.

Broyles, Allen R.: *See*—
Massie, Stephen N.; and Broyles, Allen R., 4,487,753, Cl. 423-573.00R.

Broziat, Horst. Infinitely variable transmission. 4,487,086, Cl. 74-198.000.

Brucker, Stephen E.; and Blankenship, Larry K., to Jaycor. Receiver garment for weapons engagement simulation system. 4,487,583, Cl. 434-22.000.

Bruneau, Alain, to Alpia S.A. Control device for drawing instruments. 4,486,956, Cl. 33-438.000.

Brunswick Corporation: *See*—
Friedel, David G.; and Litjens, John J., 4,487,587, Cl. 440-51.000.
Scheie, Carl E.; and Knoebel, Howard, 4,487,788, Cl. 427-9.000.

Buchel, Karl H.: *See*—
Elbe, Hans-Ludwig; Jautelat, Manfred; Buchel, Karl H.; Schaller, Klaus; and Plempel, Manfred, 4,487,776, Cl. 424-269.000.

Buchheit, Otto K., to Mannesmann Aktiengesellschaft. Stacking machine for rolled bar shapes. 4,487,540, Cl. 414-30.000.

Budd Company, The: *See*—
Eggert, Walter S., Jr., 4,487,133, Cl. 105-224.100.

Budzich, Tadeusz, to Caterpillar Tractor Co. Compensated fluid flow control. 4,487,018, Cl. 60-452.000.

Budzik, Gerald P.: *See*—
Donahoe, Patricia K.; Budzik, Gerald P.; and Mudgett-Hunter, Meredith, 4,487,833, Cl. 435-172.200.

Buikema, Wolter, to Hollandse Signaalapparaten B.V. Energy converter. 4,488,213, Cl. 363-58.000.

Burandt, Wesley A.; and Markunas, Albert L., to Sundstrand Corporation. Electro-hydraulic control system for a power drive unit. 4,487,109, Cl. 91-506.000.

Burbank, John E., III, to Minnesota Mining and Manufacturing Company. Card separating members for a microfiche storage and retrieval system. 4,487,487, Cl. 353-103.000.

Burbank, John E., III, to Minnesota Mining and Manufacturing Company. Microfiche guidance and buckling detection system. 4,487,488, Cl. 353-122.000.

Burchart, Joachim, to Nixdorf Computer AG. Information input and output unit for data processing equipment. 4,488,146, Cl. 340-407.000.

Burge, Russell W. Bench mounted workpiece clamping straightedge. 4,487,403, Cl. 269-2.000.

Burgher, Peter H.: *See*—
Allen, Robert L.; and Burgher, Peter H., 4,486,995, Cl. 52-309.800.

Burgio, Paul A.: *See*—
Knudsen, Walter L.; and Burgio, Paul A., 4,487,210, Cl. 128-785.000.

Burkett, John P.: *See*—
Vuckovich, Michael; Burkett, John P.; and Sallustio, Joseph, 4,487,741, Cl. 376-271.000.

Burlage, Brian J.; Wiklund, David E.; and Lenz, Gary A., to Fisher Controls International, Inc. Vortex flow meter. 4,487,076, Cl. 73-861.240.

Burlington Industries, Inc.: *See*—
Daniel, Vernon T.; Robbins, Edward J.; and Wang, Kenneth Y., 4,488,014, Cl. 191-12.20R.

Burmester, Russell F.: *See*—
Pomeroy, Dan M.; and Burmester, Russell F., 4,487,271, Cl. 173-29.000.

Burndy Corporation: *See*—
Allen, William, 4,486,949, Cl. 29-861.000.

Burnham, Walter J., to Westinghouse Electric Corp. Friction drive transmission. 4,487,090, Cl. 74-798.000.

Burroughs Corporation: *See*—
Bolton, Brent C.; Logsdon, Gary L.; Hagenmaier, Carl F., Jr.; and Wilson, Jesse R., 4,488,151, Cl. 340-825.500.
Hoge, Carl E., 4,487,638, Cl. 148-24.000.
Lee, Shi-Chuan, 4,488,063, Cl. 307-289.000.

Burton, Elmer E.: *See*—
Tittes, Allan F.; Larson, Kenneth H.; Burton, Elmer E.; and Britton, Kennith L., 4,487,399, Cl. 266-158.000.

Buschow, Kurt H. J.: *See*—
Willems, Johannes J. G. S. A.; van Beek, Johann R. G. C. M.; and Buschow, Kurt H. J., 4,487,817, Cl. 429-27.000.

Bush, James A.: *See*—
Nettleton, Donald E., Jr.; Bush, James A.; Bradner, William T.; and Doyle, Terrence W., 4,487,925, Cl. 536-24.000.

Butler, Frederick M., Jr.: *See*—
Colgate, Samuel O., 4,488,024, Cl. 200-330.000.

Butts, Lawrence D., to Scovill Inc. Keycard reader. 4,488,036, Cl. 235-482.000.

Buurman, Cornelis; and Plaschkes, Arnon, to Shell Oil Company. Mixing apparatus. 4,487,510, Cl. 366-337.000.

Cable Technology Laboratories, Ltd.: *See*—
Bahder, George, 4,487,994, Cl. 174-73.00R.

Cabot Corporation: *See*—
Crook, Paul; and Zordan, Richard D., 4,487,630, Cl. 75-123.00B.

Cahoon, John B.; and Fishler, Mark K., to Vesuvius Crucible Company. Continuous casting apparatus and a method of using the same. 4,487,251, Cl. 164-475.000.

Caldwell, Eldon L.: *See*—
Syme, Duncan C.; Caldwell, Eldon L.; Ferguson, Robert W.; Andors, Derik K.; and McLaughlin, Charles B., Jr., 4,487,195, Cl. 126-77.000.

Calhoun, Bill L.: *See*—
Calhoun, Tom L.; and Calhoun, Bill L., 4,487,316, Cl. 206-443.000.

Calhoun, Tom L.; and Calhoun, Bill L. Elevator holder for perm rods. 4,487,316, Cl. 206-443.000.

Calvert, James W.: *See*—
Wiatt, James G.; Calvert, James W.; Belcher, Samuel L.; and Smith, Roger D., 4,487,568, Cl. 425-534.000.

Cam Gears Limited: *See—*
Adams, Frederick J., 4,487,225, Cl. 137-625.220.
Cameron Iron Works, Inc.: *See—*
Kelly, Thomas P., 4,487,527, Cl. 405-211.000.
Campbell, George W.; and Muench, Jerome T., to United States Borax & Chemical Corporation. Boric acid having improved handling properties. 4,487,803, Cl. 428-403.000.
Campbell, Ian M.; Baulch, Donald L.; and Chappel, Jonathan M., to Interox Chemicals Limited. Nitration of organic compounds. 4,487,988, Cl. 568-943.000.
Campitello, Nicholas: *See—*
Sams, H. Wayne; and Campitello, Nicholas, 4,488,102, Cl. 318-810.000.
Cane, David A.: *See—*
Binder, Paul; and Cane, David A., 4,488,217, Cl. 364-200.000.
Cann, Gordon L. Magnetoplasmadynamic apparatus for the separation and deposition of materials. 4,487,162, Cl. 118-723.000.
Canon Kabushiki Kaisha: *See—*
Ikari, Hideo; and Hirohata, Michio, 4,487,493, Cl. 354-234.100.
Katagiri, Kazuharu; Watanabe, Katsunori; Sakai, Kiyoshi; Ishikawa, Shozo; and Kitahara, Makoto, 4,487,824, Cl. 430-58.000.
Katsuma, Makoto; Alyfuku, Kiyoshi; Kawamura, Masaharu; Kiuchi, Masayoshi; and Murakami, Hiroyasu, 4,488,145, Cl. 340-384.00E.
Nakano, Shigeki; Yamada, Yasuyoshi; and Hiraga, Ryozo, 4,487,505, Cl. 356-400.000.
Ozawa, Toshiaki; Yamada, Yasuaki; and Kondo, Hiroatsu, 4,487,517, Cl. 400-279.000.
Toyoda, Yasuhiro; Suzuki, Masayuki; and Yamamichi, Masayoshi, 4,487,492, Cl. 354-234.100.
Cantarel, Pierre, to Brown, Boveri & Cie AG. Associative access-memory. 4,488,260, Cl. 365-49.000.
Cantec Inc.: *See—*
Frei, Siegfried, 4,487,048, Cl. 72-94.000.
Cap, Hinrich; von der Heide, Johann; and Muller, Rolf, to Papast-Motoren GmbH & Co. KG. Speed control for a rotary machine. 4,488,096, Cl. 318-328.000.
Carder, Mervin L., Sr., to M. Carder Industries, Inc. Nozzle having improved low flow characteristics and poppet therefor. 4,487,238, Cl. 141-206.000.
Carl Freudenberg, Firma: *See—*
Sakai, Katsuhide, 4,486,902, Cl. 2-97.000.
Carlin, John A.; Mesch, William G.; Thompson, Randall D.; Beard, Steven A.; and Stephens, Tracy R., to Cypher Systems. Storage tank level monitoring apparatus and method therefor. 4,487,065, Cl. 73-290.00V.
Carpenter Technology Corporation: *See—*
DeBold, Terry A.; Frick, Douglas G.; and Kutzamanis, John S., 4,487,744, Cl. 420-584.000.
Carrier Corporation: *See—*
Rogers, Richard D.; and Hopkinson, Harold H., 4,487,031, Cl. 62-160.000.
Sams, H. Wayne; and Campitello, Nicholas, 4,488,102, Cl. 318-810.000.
Carrington, James E.; Gregor, John S.; and Westcott, Gerald R., to International Business Machines Corporation. Fault protection system for a line printer. 4,487,121, Cl. 101-93.140.
Carsten, Ralph T., to Northern Telecom Limited. Frequency shift keying demodulator using a phase locked loop and voltage comparator. 4,488,120, Cl. 329-122.000.
Carter, Heard L. Self-flushing rotatable pop-up water delivery head for pool cleaning systems. 4,486,907, Cl. 4-490.000.
Carter, Nicholas J. R.; Middleton, Francisco A.; and Das, Santanu, to International Telephone and Telegraph Corporation. Combining and splitting of voice and data from multiple terminal sources and electronic PABX for same. 4,488,287, Cl. 370-58.000.
Carter, Randy E.; and Schmidt, Ernst R., to Stollie Corporation, The. Gas/electric operated absorption refrigerator having automatic flame detection and restart capability with visual indication of operating status. 4,487,030, Cl. 62-141.000.
Cartman, Frank P.: *See—*
Bond, George L.; Cartman, Frank P.; and Ryan, Philip M., 4,488,298, Cl. 371-11.000.
Carty, John J. Method for construction of a precast chimney. 4,486,984, Cl. 52-125.500.
Casasent, David P.: *See—*
Hester, Charles F.; and Casasent, David P., 4,487,476, Cl. 350-162.130.
Cascade Corporation: *See—*
Sifri, Elie C., 4,487,218, Cl. 137-355.260.
Case, Allen W., Jr.; Kuchar, Norman R.; and Peroutky, Donald C., to General Electric Company. Arc welding torch with integral vision sensor. 4,488,032, Cl. 219-124.340.
Casqueiro, Lawrence: *See—*
Taylor, Frederick G.; and Casqueiro, Lawrence, 4,487,539, Cl. 413-55.000.
Cassina SpA: *See—*
Rodriquez, Rodrigo, 4,487,450, Cl. 297-111.000.
Cassinelli, Giuseppe, to Savio & C. S.p.A. Device for transferring tubular fabrics from support hangers to a rigid body and inverting the fabric. 4,487,546, Cl. 414-751.000.
Caterpillar Tractor Co.: *See—*
Bianchetta, Donald L.; and White, Robert W., 4,487,255, Cl. 165-39.000.
Budzich, Tadeusz, 4,487,018, Cl. 60-452.000.
Cegles, William P.: *See—*
Webb, Fred C.; Head, Michael B.; and Cegles, William P., 4,488,201, Cl. 361-334.000.
Celanese Corporation: *See—*
Chenevey, Edward C.; and Kafchinski, Ronald, 4,487,735, Cl. 264-85.000.
Fruchey, Olan S., 4,487,720, Cl. 260-419.000.
Shimp, David A.; and Graver, Richard B., 4,487,948, Cl. 549-552.000.
Centre D'Etudes Du Fraisage: *See—*
Rouzaud, Guy, 4,487,536, Cl. 409-239.000.
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Berger, Antoine; and Gibert, Francois, 4,487,559, Cl. 418-25.000.
Cepko, Constance L.: *See—*
Sharp, Phillip A.; Cepko, Constance L.; and Changelian, Paul, 4,487,829, Cl. 435-7.000.
Ceshkovsky, Ludwig; and Dakin, Wayne R., to Discovision Associates. Tracking system for video disc player. 4,488,275, Cl. 369-44.000.
Chall, Steven B.: *See—*
Hegadorn, Joseph L.; Chall, Steven B.; and Stevenson, Richard B., 4,487,023, Cl. 62-1.000.
Challenge Systems, Inc.: *See—*
Wagner, Martin D., Jr.; and Mathews, Phillip A., 4,488,226, Cl. 364-200.000.
Chambers, Derek, to Spellman High Voltage Electronics Corp. High-power, high-frequency inverter system with combined digital and analog control. 4,488,214, Cl. 363-71.000.
Chandler Evans Inc.: *See—*
Leachman, Frank A., Jr.; and Noell, Godwin L., 4,487,548, Cl. 415-28.000.
Chang, Tsuan Y., to Halcon SD Group, Inc., The. Process for the thermal dewatering of young coals. 4,486,959, Cl. 34-9.000.
Changelian, Paul: *See—*
Sharp, Phillip A.; Cepko, Constance L.; and Changelian, Paul, 4,487,829, Cl. 435-7.000.
Chappel, Jonathan M.: *See—*
Campbell, Ian M.; Baulch, Donald L.; and Chappel, Jonathan M., 4,487,988, Cl. 568-943.000.
Charbonneau, Jack W.: *See—*
Turnbull, Everett M.; and Charbonneau, Jack W., 4,487,801, Cl. 428-313.500.
Chataignon, Andre ; Poirier, Jean-Pierre; and Phan Tich, Du, to Thomson-CSF-Telephone. Speech-amplifier telephone station. 4,488,007, Cl. 179-81.00B.
Cheffer, Harold H., to NCR Corporation. Snubber circuit for use in an uninterruptible power supply. 4,488,058, Cl. 307-66.000.
Chekroun, Isaac; and Heymes, Alain, to Sanofi. Process for the preparation of 2-(thien-2-yl)- and 2-(thien-3-yl)-ethylamine derivatives. 4,487,931, Cl. 546-280.000.
Chemcut Corporation: *See—*
Cordes, Franz R., 4,487,681, Cl. 204-434.000.
Chemische Werke Huls AG: *See—*
Feldmann, Rainer; and Scholten, Heinz, 4,487,895, Cl. 525-432.000.
Chemplex Company: *See—*
Adur, Ashok M.; Schmukler, Seymour; Machonis, John, Jr.; and Shida, Mitsuzo, 4,487,885, Cl. 525-74.000.
Chen, Thomas. Garment hanger. 4,487,343, Cl. 223-85.000.
Chenevey, Edward C.; and Kafchinski, Ronald, to Celanese Corporation. Process for preparing film of poly{[benzo(1,2-d:4,5-d')bisthiazole-2,6-diyl]-1,4-phenylene}, its cis isomer or mixtures thereof. 4,487,735, Cl. 264-85.000.
Cherian, Gabe, to Raychem Corporation. Heat recoverable connecting device. 4,487,465, Cl. 339-30.000.
Chernotsky, Alan; and Satz, Richard. Resettable power limiting apparatus. 4,488,106, Cl. 323-239.000.
Chervonenko, Viktor M.: *See—*
Antonov, Veniamin V.; Bat, Jury I.; Gamalei, Edvin I.; Dolzhenkov, Fedor E.; Donskoi, Semen A.; Kulichenko, Valentin A.; Tischenko, Oleg I.; Shtepa, Evgeny D.; and Chervonenko, Viktor M., 4,487,397, Cl. 266-44.000.
Chevron Research Company: *See—*
Spatz, David M., 4,487,777, Cl. 424-274.000.
Yamaguchi, Elaine S.; and Liston, Thomas V., 4,487,704, Cl. 252-33.400.
Chiappetta, Ferdinand; Simpson, John H.; and Simpson, Neville H., to AMSTED Industries Incorporated. Multi-layer, parallel lay, coreless wire rope. 4,487,010, Cl. 57-213.000.
Chiba, Hiroshi; and Ogura, Shoichi, to Nippon Electric Co., Ltd.; and Sumitomo Metal Mining Company Limited. Method for forming lead frame for integrated circuit devices. 4,486,948, Cl. 29-827.000.
Chijiiwa, Masaru: *See—*
Matsuda, Norio; Wada, Yasumitsu; and Chijiiwa, Masaru, 4,488,012, Cl. 179-115.50R.
Chikaraishi, Takayo: *See—*
Miyamoto, Issei; Utsumi, Shunji; and Chikaraishi, Takayo, 4,487,441, Cl. 292-336.300.
Chikuma, Toichi. Illumination mode selecting device for illumination lamp. 4,488,092, Cl. 315-324.000.
Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Rt.: *See—*
Szoke, Sandor; Lugosi, Gyorgy; Bakonyi, Maria; Ghyczy, Jeno ; and Csermely, Gyorgy, 4,487,936, Cl. 548-139.000.
Chisso Corporation: *See—*
Ishibashi, Tadao; and Kugimiya, Youichi, 4,487,871, Cl. 524-100.000.

Sugimori, Shigeru; Kojima, Tetsuhiko; and Tsuji, Masakazu, 4,487,954, Cl. 560-107.000.
Chitsaz, Sirus: *See*—
Krisher, Dale L.; and Chitsaz, Sirus, 4,488,255, Cl. 364-900.000.
Chiwaki, Yoshinori, to Nippon Electric Co., Ltd. Control apparatus for a plurality of memory units. 4,488,223, Cl. 364-200.000.
Chiyoda Chemical Engineering & Construction Co., Ltd.: *See*—
Gomi, Shimpei; Arai, Tomio; Takeuchi, Tomomitsu; Miwa, Shigeru; Takatsuka, Toru; and Watari, Ryuzo, 4,487,686, Cl. 208-48.00R.
Choi, Doo H.: *See*—
Min, Sung K.; Lee, Bang W.; and Choi, Doo H., 4,488,094, Cl. 318-16.000.
Christen, Roland W.; and Deichstetter, Alfred A., to Sundstrand Corporation. Protective circuit for clutchless parallel generating system. 4,488,198, Cl. 361-20.000.
Christensen, Terrence B.; McNaughton, Allen D.; and Umbach, Steven R., to Systex (U.S.A.) Inc. Injection device. 4,487,602, Cl. 604-137.000.
Christensen, Tore L.; Haygood, Gail L.; Spencer, Douglas A.; and Szymanski, Steven J., to AT&T Bell Laboratories. Establishing and supporting data traffic in private branch exchanges. 4,488,294, Cl. 370-84.000.
Chun, Hugh H., to VSI Corporation. Failure sensing hydraulic accumulator and system. 4,487,226, Cl. 138-30.000.
Chung, Daniel A., to Goodyear Aerospace Corporation. Fuel and hydrolysis resistant polyurethane. 4,487,913, Cl. 528-83.000.
Chung, Kwong T., to RCA Corporation. Damping material. 4,488,282, Cl. 369-135.000.
Chung, Kwong T., to RCA Corporation. Epoxy resin. 4,488,283, Cl. 369-135.000.
Chyron Corporation: *See*—
Rabinowitz, David B., 4,488,180, Cl. 358-183.000.
Ciabatti, Romeo, to Gruppo Lepetit S.p.A. Process for producing 2-amino-2-arylacetonitriles. 4,487,721, Cl. 260-465.00E.
Ciambarella, Ernest; and Quirk, Jeffrey L. Orthopedic back support for an automobile. 4,487,201, Cl. 128-134.000.
Ciba-Geigy Corporation: *See*—
Fory, Werner; Gass, Karl; Meyer, Willy; and Schurter, Rolf, 4,487,951, Cl. 560-12.000.
Mausezahl, Dieter, 4,487,610, Cl. 8-524.000.
Nachbur, Hermann; and Guth, Christian, 4,487,800, Cl. 428-265.000.
Putzar, Roland, 4,487,609, Cl. 8-524.000.
Reinehr, Dieter; and Pfeifer, Josef, 4,487,947, Cl. 549-492.000.
Zweifel, Hans; Schilling, Walter; Storni, Angelo; and Bellus, Daniel, 4,487,942, Cl. 549-236.000.
Cincinnati Milacron Inc.: *See*—
Wiatt, James G.; Calvert, James W.; Belcher, Samuel L.; and Smith, Roger D., 4,487,568, Cl. 425-534.000.
Citizen Watch Company Limited: *See*—
Ebihara, Heihachiro, 4,487,099, Cl. 84-1.260.
Matsumoto, Masataka, 4,487,513, Cl. 368-294.000.
Ciuti, Brunello, to Agip Petroli S.p.A. Aqueous neutralizing and lubricating composition for diesel engines. 4,487,658, Cl. 252-33.200.
Claas, Helmut; and Ostrup, Heinrich, to Claas OHG. Drawing roller with controlled drawing fingers for agricultural machine. 4,487,005, Cl. 56-14.500.
Claas OHG.: *See*—
Claas, Helmut; and Ostrup, Heinrich, 4,487,005, Cl. 56-14.500.
Claassen, George R.; and Ewing, John J., to PPG Industries, Inc. Method of and apparatus for removing sharply bent glass sheets from press bending molds. 4,487,623, Cl. 65-106.000.
Claes, Roger G., to GTE Products Corporation. Bifurcated electroacoustic delay lines having transducers bonded at an area of bifurcation. 4,488,127, Cl. 333-142.000.
Clairol Incorporated: *See*—
Stewart, James B.; and Bertelsen, Paul, 4,486,915, Cl. 15-187.000.
Clark, Bill B.: *See*—
Tucker, Thomas L.; and Clark, Bill B., 4,486,928, Cl. 29-26.00A.
Clarke, James W.; Kimber, Geoffrey M.; and Rantell, Terry D., to Coal Industry (Patents) Limited. Coal extraction. 4,487,682, Cl. 208-8.0LE.
Clarke, Patrick W., to OPT Industries, Inc. AC-DC Switching regulator uninterruptible power supply. 4,488,057, Cl. 307-66.000.
Claverie, Claude; and Eouzan, Jean-Yves, to Thomson-CSF. Protection device for a laser diode. 4,488,305, Cl. 372-38.000.
Clawson Machine Company, Inc.: *See*—
Fletcher, Charles J.; and Moshier, Everett, 4,487,024, Cl. 62-3.000.
Clay, Burton R.; and Thrailkill, William O., to Honeywell Inc. Line scan reader/writer by holographic collection. 4,488,042, Cl. 250-235.000.
Clearman, Jack F. Vane-driven wobbling sprinkler device. 4,487,368, Cl. 239-229.000.
Clegg, Michael W.: *See*—
Hall, James R.; Harter, Donald P.; Clegg, Michael W.; and Gerber, James E., 4,486,932, Cl. 29-157.00R.
Coal Industry (Patents) Limited: *See*—
Clarke, James W.; Kimber, Geoffrey M.; and Rantell, Terry D., 4,487,682, Cl. 208-8.0LE.
Coates, Stephen R.; and Binder, Walter L., to American Hoechst Corporation. Enzyme/immunofluorescent assay for autoantibodies. 4,487,830, Cl. 435-7.000.
Coca-Cola Company, The: *See*—
Barrash, Marshall J., 4,487,319, Cl. 206-602.000.
Cochcroft, Arthur F., Jr.; and Lockwood, James M., to NCR Corporation. Circuit for reusing previously fetched data. 4,488,222, Cl. 364-200.000.
Cohen, Stuart B.: *See*—
Haussmann, Robert H.; Cohen, Stuart B.; and Bandini, Arthur L., 4,488,293, Cl. 370-84.000.
Cole, Lucille J.; Huang, Leeyan; and Liesch, Jerrold M., to Merck & Co., Inc. Dopamine β-hydroxylase inhibitors. 4,487,761, Cl. 424-118.000.
Colgate-Palmolive Company: *See*—
Daykin, Kenneth; and Straw, Alan, 4,487,341, Cl. 222-391.000.
Kiozpeoplou, Diana K., 4,487,757, Cl. 424-7.100.
Colgate, Samuel O., to Butler, Frederick M., Jr. Wall switch cover and actuator. 4,488,024, Cl. 200-330.000.
Colibri Lighters Limited: *See*—
Lowenthal, Hans, 4,487,570, Cl. 431-130.000.
Colley, Jacques L. J.; and Vrydags, Andre P. J., to ITT Industries, Inc. Cooking appliance with lid and open work basket. 4,487,117, Cl. 99-341.000.
Collins, Adrian V.; and Narsine, Patrick M., to Com Dev Ltd. Temperature compensated resonant cavity. 4,488,132, Cl. 333-229.000.
Collins, Bobby W., to Power Tork Hydraulics, Inc. Squeeze torque wrench. 4,487,095, Cl. 81-57.390.
Collins, Clifford H. Infinitely variable gear ratio transmission. 4,487,085, Cl. 74-113.000.
Collins, Kenneth D.: *See*—
Held, Jimmy L.; Collins, Kenneth D.; and Mackelburg, Gerald R., 4,488,271, Cl. 367-151.000.
Collomb, Joelle: *See*—
Bailly, Jean C.; and Collomb, Joelle, 4,487,846, Cl. 502-154.000.
Com Dev Ltd.: *See*—
Collins, Adrian V.; and Narsine, Patrick M., 4,488,132, Cl. 333-229.000.
Combustion Engineering, Inc.: *See*—
Bozzuto, Carl R., 4,487,683, Cl. 208-8.00R.
Deve, Vagn, 4,487,372, Cl. 241-65.000.
Leaseburge, Emory J.; and Perkins, Curtis L., 4,487,080, Cl. 73-863.830.
Natale, Joseph J., 4,487,252, Cl. 165-7.000.
Commercial Enclosed Fuse Company: *See*—
Rooney, William J.; and Rooney, Francis J., 4,488,137, Cl. 337-162.000.
Commissariat a l'Energie Atomique: *See*—
Bellanger, Gilbert; and Giroux, Pierre, 4,487,670, Cl. 204-129.000.
Bret, Antoine, 4,487,742, Cl. 376-298.000.
David, Bernard; and Pigeon, Michel, 4,488,114, Cl. 324-225.000.
Commonwealth of Australia, The: *See*—
McLeary, Ross C.; and Beckwith, Peter J., 4,488,310, Cl. 372-58.000.
Compagnie Generale D'Electricite: *See*—
Barraud, Jean-Yves; Tourillon, Gerard; and Arnould, Francois, 4,487,661, Cl. 204-1.00T.
Galaj, Stanislas, 4,487,689, Cl. 210-108.000.
Compagnie Industrielle des Telecommunications Cit-Alcatel: *See*—
Petit, Andre ; and Jamet, Daniel, 4,487,466, Cl. 339-32.00M.
Compagnie Internationale pour l'Informatique Cii-Honeywell Bull: *See*—
Michel, Helle, 4,488,194, Cl. 360-113.000.
Compton, Fred A. Holder for roll of paper towels. 4,487,376, Cl. 242-55.540.
Compton, William H.; and Likozar, Joseph M., to Comptrol, Incorporated. Dual range force transducer. 4,487,079, Cl. 73-862.520.
Comptrol, Incorporated: *See*—
Compton, William H.; and Likozar, Joseph M., 4,487,079, Cl. 73-862.520.
Connaught Laboratories Limited: *See*—
Goosen, Mattheus F. A.; O'Shea, Geraldine M.; and Sun, Anthony M. F., 4,487,758, Cl. 424-21.000.
Conners, James M.: *See*—
DesRochers, Donald J.; and Conners, James M., 4,486,989, Cl. 52-194.000.
Connolly, James D. Centrifuge screen basket. 4,487,695, Cl. 210-380.100.
Conoco Inc.: *See*—
Sweeney, William T., 4,487,438, Cl. 285-349.000.
Taylor, Larry D.; Miller, David M.; and Thakur, Pramod C., 4,487,615, Cl. 55-84.000.
Continental Plastic Beverage Bottles, Inc.: *See*—
Ambrose, Everett J., 4,487,358, Cl. 229-27.000.
Control Data Corporation: *See*—
Jopke, Walter H., Jr.; and Shier, John S., 4,486,946, Cl. 29-590.000.
Control Power Systems Inc.: *See*—
Jeffers, Edward A.; McLeroy, R. Philip; and Sacerio, Jose L., 4,488,118, Cl. 324-455.000.
Cooley, John J.; and Oosterbaan, DuWayne D., to NCR Corporation. Intellectual properties protection device. 4,488,001, Cl. 178-22.090.
Cooper LaserSonics, Inc.: *See*—
Warrin, George E., 4,487,582, Cl. 433-88.000.
Coppin, James A., to AEL Microtel Limited. Method of manufacturing printed wiring boards. 4,487,654, Cl. 156-645.000.
Coran, Aubert Y.; and Patel, Raman, to Monsanto Company. Phenolic modified urethane elastomer. 4,487,888, Cl. 525-132.000.
Corcom, Inc.: *See*—
Webb, Fred C.; Head, Michael B.; and Cegles, William P., 4,488,201, Cl. 361-334.000.

Cordes, Franz R., to Chemcut Corporation. Electroplating test cell. 4,487,681, Cl. 204-434.000.

Cordiano, Ettore, to Corint S.r.l. Power-assisted rack-and-pinion steering mechanism. 4,487,281, Cl. 180-148.000.

Cordis Corporation: *See*—
Harris, Donald L., 4,487,603, Cl. 604-152.000.

Corint S.r.l.: *See*—
Cordiano, Ettore, 4,487,281, Cl. 180-148.000.

Cornell Research Foundation, Inc.: *See*—
Padamsee, Hasan S., 4,487,637, Cl. 148-6.300.
Raj, Rishi; and Baik, Sunggi, 4,487,840, Cl. 501-97.000.

Cornish, James E.; and Manning, Edward T., Jr., to Dravo Corporation. Method for random car train positioning. 4,487,547, Cl. 414-786.000.

Cosden Technology, Inc.: *See*—
MacLaughlin, Donald N., 4,488,097, Cl. 318-443.000.

Cosenza, Michael A. Foundation drain system. 4,486,986, Cl. 52-169.500.

Cotter, William L.: *See*—
Aronson, Herbert L.; Wingate, Sidney A.; Cotter, William L.; and Brisk, Richard A., 4,488,237, Cl. 364-476.000.

Coughlin, James E.; Sommerfeld, Eugene G.; and Strolle, Clifford H., to Du Pont de Nemours, E. I., and Company. Ternary adhesive systems containing a polyester polyol, an isocyanate-polyester-urethane, and a crosslinking agent which is a polyisocyanate. 4,487,909, Cl. 528-60.000.

Coulter Corporation: *See*—
Auer, Robert E., 4,487,320, Cl. 209-3.100.

Coutures, Jean L.: *See*—
Benoit-Gonin, Roger; Berger, Jean L.; and Coutures, Jean L., 4,488,129, Cl. 333-165.000.

Cove, Peter L.: *See*—
Appleby, Robert H.; and Cove, Peter L., 4,487,522, Cl. 403-231.000.

CPC International Inc.: *See*—
Heady, Robert E.; and Alonso, Jorge H., 4,487,832, Cl. 435-135.000.

Crane, Leslie J.: *See*—
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Craun, Gary P., to SCM Corporation. Aqueous glycoluril thermosetting coating. 4,487,889, Cl. 525-163.000.

Crawford, Richard A., to Armco, Inc. Poppet type fluid valve with replaceable wear surface. 4,487,222, Cl. 137-516.290.

Creative Research and Manufacturing Inc.: *See*—
Mehl, Donald N., 4,487,209, Cl. 128-754.000.

Crisp, Richard D.: *See*—
Zolnowsky, John E.; Keshlear, William M.; and Crisp, Richard D., 4,488,256, Cl. 364-900.000.

Critikon, Inc.: *See*—
McGaughey, John; McVay, W. Patrick; and Lauer, William, 4,487,605, Cl. 604-168.000.

Cronin, Michael J.; and Seid, Gordon, to Lockheed Corporation. Energy-efficient all-electric ECS for aircraft. 4,487,034, Cl. 62-402.000.

Cronin, Michael J., to Lockheed Corporation. Electric constant speed/variable speed drive/generator assembly. 4,488,053, Cl. 290-4.00C.

Crook, Paul; and Zordan, Richard D., to Cabot Corporation. Wear-resistant stainless steel. 4,487,630, Cl. 75-123.00B.

Crosby, Alan D.: *See*—
Robinson, Michael; and Crosby, Alan D., 4,487,747, Cl. 423-60.000.

Crosfield Electronics Limited: *See*—
Pugsley, Peter C.; and Preston, Leonard, 4,488,171, Cl. 358-76.000.

Cross, James D. Electrical spark treatment apparatus. 4,488,030, Cl. 219-69.00R.

Crowley, Norman: *See*—
Fuchs, Gilbert; Crowley, Norman; and Wink, Randall, 4,487,132, Cl. 104-166.000.

Crudele, Lester M.; Zolnowsky, John E.; Moyer, William C.; and MacGregor, Douglas B., to Motorola, Inc. Virtual memory data processor. 4,488,228, Cl. 364-200.000.

Cryomec, Inc.: *See*—
Lutjens, Robert D.; and Duron, Paul P., 4,487,256, Cl. 165-76.000.

Csermely, Gyorgy: *See*—
Szoke, Sandor; Lugosi, Gyorgy; Bakonyi, Maria; Ghyczy, Jeno ; and Csermely, Gyorgy, 4,487,936, Cl. 548-139.000.

Cullom Machine Tool & Die, Inc.: *See*—
Dickhut, Heinrich; and Lilienthal, Alfred, 4,486,929, Cl. 29-33.00T.

Cumins, David L.: *See*—
Feanny, Michael P.; and Cumins, David L., 4,487,200, Cl. 128-80.00C.

Cummins, Millard, to Invocas, Inc. Bi-fitted incandescent electric light bulbs with internal electrically parallel conductors. 4,488,082, Cl. 313-318.000.

Curry, Paul F. Apparatus for removing a roller or workpiece. 4,486,936, Cl. 29-252.000.

Cypher Systems: *See*—
Carlin, John A.; Mesch, William G.; Thompson, Randall D.; Beard, Steven A.; and Stephens, Tracy R., 4,487,065, Cl. 73-290.00V.

Daicel Chemical Industries, Ltd.: *See*—
Ishikawa, Nobuo; and Taniguchi, Hiroki, 4,487,926, Cl. 536-82.000.

Daikin Kogyo Co., Ltd.: *See*—
Tatemoto, Masayoshi; and Amano, Toshihiko, 4,487,903, Cl. 526-247.000.
Ueta, Yutaka; Kawachi, Shoji; and Hosokawa, Kazutaka, 4,487,882, Cl. 524-505.000.

Dailey, George F.; and Luzader, Homer W., to Westinghouse Electric Corp. Dynamoelectric machine with stator coil end turn support system. 4,488,079, Cl. 310-260.000.

Dakin, Wayne R.: *See*—
Ceshkovsky, Ludwig; and Dakin, Wayne R., 4,488,275, Cl. 369-44.000.

D'Alfonso, Nunzio: *See*—
Neitz, Alfred; Pickel, Hans; and D'Alfonso, Nunzio, 4,487,178, Cl. 123-276.000.

Dalke, George W.; and Pugsley, Peter C., to LogE/Interpretation Systems Inc. Method and means for color detection and modification. 4,488,245, Cl. 364-526.000.

Daly, James M.; and Dusenberry, Gary L., to Rockcor, Inc. Pressure-activated low pressure warning device. 4,487,154, Cl. 116-34.00B.

Danchenko, Valentin N.; Zayats, Alexandr A.; Potapov, Ivan N.; Finagin, Petr M.; and Kutsenko, Sergei P., to Dnepropetrovsky Metallurgichesky Institut. Working mandrel and method of rolling elongate hollow pieces in a multi-stand continuous mill on same working mandrel. 4,487,049, Cl. 72-208.000.

Daniel, Vernon T.; Robbins, Edward J.; and Wang, Kenneth Y., to Burlington Industries, Inc. Reeling assembly. 4,488,014, Cl. 191-12.20R.

Dao, Hoa T., to OMI International Corporation. Plating barrel. 4,487,159, Cl. 118-418.000.

Dapco Industries, Inc.: *See*—
Pagano, Dominick A.; and Morris, Kevin S., 4,487,071, Cl. 73-612.000.

Das, Santanu: *See*—
Carter, Nicholas J. R.; Middleton, Francisco A.; and Das, Santanu, 4,488,287, Cl. 370-58.000.

Dauphine, Thonet C., to Raytheon Company. Apparatus and method for production of organic products from kerogen. 4,487,257, Cl. 166-60.000.

David, Bernard; and Pigeon, Michel, to Commissariat a l'Energie Atomique. Device for non-destructive testing by eddy currents comprising air-gap correction means. 4,488,114, Cl. 324-225.000.

Davidson, Daniel F.: *See*—
Thatcher, Gordon; and Davidson, Daniel F., 4,487,739, Cl. 376-234.000.

Davies, Francis J. Jetter unit. 4,487,223, Cl. 137-561.00R.

Davis, James A.; and Moon, Lamar F., to Rockwell International Corporation. Porous-wall compact laser diffuser. 4,487,366, Cl. 239-11.000.

Davis, Pauls: *See*—
Wilson, Joe C.; and Davis, Pauls, 4,487,712, Cl. 252-78.300.

Davis, Richard A.; Moss, Stanton K.; and Wang, Sang-Yen, to International Business Machines Corporation. Closed loop cooling system for disk file with heat exchanger integral with baseplate. 4,488,193, Cl. 360-98.000.

Davis, Steven J.; and Hanko, Leonard, to United States of America, Air Force. Optically pumped iodine monofluoride laser. 4,488,311, Cl. 372-89.000.

Day, Donal F.; and Workman, Wesley E., to Research Corporation. Process for the conversion of cellulose to glucose. 4,487,831, Cl. 435-99.000.

Day, Thomas E. Comminution apparatus. 4,487,371, Cl. 241-48.000.

Dayco Corporation: *See*—
Hollaway, Gerald C., Jr., 4,487,814, Cl. 428-57.000.
Quick, Terrence R.; and Oliver, Larry R., 4,487,595, Cl. 474-15.000.

Daykin, Kenneth; and Straw, Alan, to Colgate-Palmolive Company. Dispenser for dispensing creams and especially self-foaming gels. 4,487,341, Cl. 222-391.000.

DCA Design Consultants Limited: *See*—
Withnall, Malcolm D. N.; Pemberton, Martin J.; and McManus, Kevin, 4,488,035, Cl. 235-384.000.

DeBold, Terry A.; Frick, Douglas G.; and Kutzamanis, John S., to Carpenter Technology Corporation. Corrosion resistant austenitic alloy. 4,487,744, Cl. 420-584.000.

Debs, Victor, to Levolor Lorentzen, Inc. Venetian blind. 4,487,243, Cl. 160-168.000.

DeCesare, Dominic. Alternator with rotor axial flux excitation. 4,488,075, Cl. 310-156.000.

Dedisse, Mary R.: *See*—
Bogart, Frank J.; Dedisse, Mary R.; Divakaruni, Radhakrishna S.; Fette, Charles J.; Knight, Keith S.; Page, Karen L.; and Paxton, Thornton S., 4,488,004, Cl. 179-18.0AD.

Deere & Company: *See*—
Becker, Manfred, 4,487,460, Cl. 384-620.000.
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Degussa Aktiengesellschaft: *See*—
Dorbath, Bernd; Schlodder, Rainer; and Giesecke, Norbert, 4,487,664, Cl. 204-44.300.

Deiana, Salvatore. Floating highway. 4,487,151, Cl. 114-266.000.

Deichstetter, Alfred A.: *See*—
Christen, Roland W.; and Deichstetter, Alfred A., 4,488,198, Cl. 361-20.000.

DeJardins, Andre P., to Societe Industrielle D'Appareils Automatiques. Automatic beverage vending machine. 4,487,337, Cl. 222-129.300.

Delfino, Allan B.: *See*—
McTamaney, Louis S.; Delfino, Allan B.; Waltrip, Delbert F.; and Kirkpatrick, Thomas I., 4,487,061, Cl. 73-151.000.

Dellinger, Thomas A.; and Hampton, Clifton G., to Siecor Corporation. Telephone network interface device. 4,488,008, Cl. 179-81.00R.

DeLuca, Raymond F.: *See—*
Rasmussen, Holger; Jespersen, Paul W.; and DeLuca, Raymond F., 4,487,375, Cl. 242-55.300.
Demoute, Jean-Pierre: *See—*
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Derbenwick, Gary F.: *See—*
Ryden, William D.; Hanson, Matthew V.; Derbenwick, Gary F.; Gnadinger, Alfred P.; and Adams, James R., 4,486,943, Cl. 29-571.000.
Derrenbacker, James A., Jr.: *See—*
Lewis, Roy R., III; and Derrenbacker, James A., Jr., 4,487,588, Cl. 441-43.000.
DeSoto, Inc.: *See—*
Sekmakas, Kazys; and Shah, Raj, 4,487,940, Cl. 548-320.000.
Sekmakas, Kazys; and Shah, Raj, 4,487,941, Cl. 548-320.000.
Despins, Paul. Apparatus for stringing power lines across supporting towers. 4,487,395, Cl. 254-134.30R.
DesRochers, Donald J.; and Conners, James M. Elevated storage tank. 4,486,989, Cl. 52-194.000.
Dessau, Ralph M., to Mobil Oil Corporation. Selective sorption of lubricants of high viscosity index. 4,487,688, Cl. 208-310.00Z.
DeTorre, Robert P., to PPG Industries, Inc. Method and apparatus for cutting pattern shaped holes in glass sheets. 4,487,350, Cl. 225-2.000.
De Vaughn, Donald H.; Watts, Philip S.; Raty, Dallas L.; and Maker, Edward H., II, to De Vaughn, Donald H.; and Maker, Edward H., III. Pipetting techniques using replaceable tips. 4,487,081, Cl. 73-864.130.
Deve, Vagn, to Combustion Engineering, Inc. Thermal sand reclamation system. 4,487,372, Cl. 241-65.000.
de Warrimont, Jean P. L. M. N.: *See—*
Dunning, Leslie G. W.; and de Warrimont, Jean P. L. M. N., 4,487,886, Cl. 525-86.000.
de Wied, David, to Akzo N.V. Peptides. 4,487,765, Cl. 424-177.000.
Diamond Automations, Inc.: *See—*
Bliss, George N., 4,487,321, Cl. 209-510.000.
Diamond Shamrock Chemicals Company: *See—*
Dorsett, Terry E.; and Rininger, David P., 4,487,815, Cl. 428-219.000.
Dickerson, Richard C., to Ecolochem, Inc. Vinyl acetate purification process. 4,487,959, Cl. 560-248.000.
Dickhut, Heinrich; and Lilienthal, Alfred, to Cullom Machine Tool & Die, Inc. Tile perforating unit. 4,486,929, Cl. 29-33.00T.
Dickinson, Daniel C.: *See—*
Scott, William B.; Dickinson, Daniel C.; and Arnesson, Joel C. E., 4,486,941, Cl. 29-568.000.
Dickirson, Gene D., to Ford Motor Company. Threadless connector. 4,487,437, Cl. 285-319.000.
Dienes, Larry E.; Knight, David J.; and Wurst, William R., to Bendix Corporation, The. Mechanism for cleaning and drying compressed gases. 4,487,617, Cl. 55-163.000.
Diering, Bernd: *See—*
Bohnke, Botho; and Diering, Bernd, 4,487,697, Cl. 210-605.000.
Diesel Kiki Co., Ltd.: *See—*
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Dieterich, Charles B., to RCA Corporation. Coding system for digital audio disc record. 4,488,278, Cl. 369-50.000.
DiGiacomo, Peter M.: *See—*
Dines, Martin B.; and DiGiacomo, Peter M., 4,487,922, Cl. 528-395.000.
Di Giovanni, John; Dorband, Glen C.; and Golden, Donald M., to Ethicon, Inc. Non-metallic, bio-compatible hemostatic clips. 4,487,205, Cl. 128-326.000.
Digital Equipment Corporation: *See—*
Binder, Paul; and Cane, David A., 4,488,217, Cl. 364-200.000.
Di Matteo, Paul; Rademacher, Paul; and Stern, Howard, to Robotic Vision Systems, Inc. Method of sensing the position and orientation of elements in space. 4,488,173, Cl. 358-107.000.
Dineen, John J., to Mechanical Technology Incorporated. Power control for heat engines. 4,487,020, Cl. 60-521.000.
Dines, Martin B.; and DiGiacomo, Peter M., to Occidental Research Corp. Layered organophosphorous inorganic polymers containing cyclic groups. 4,487,922, Cl. 528-395.000.
Dinkel, Emil: *See—*
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DiPardo, Robert M.: *See—*
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Director-General of the Agency of Industrial Science & Technology: *See—*
Kugimiya, Koichi; Akiyama, Shigenobu; and Fuse, Genshu, 4,487,635, Cl. 148-1.500.
Discovision Associates: *See—*
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Ditchfield, Neville J., to BICC Public Limited Company. Electric cable. 4,487,997, Cl. 174-115.000.
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Bogart, Frank J.; Dedisse, Mary R.; Divakaruni, Radhakrishna S.; Fette, Charles J.; Knight, Keith S.; Page, Karen L.; and Paxton, Thornton S., 4,488,004, Cl. 179-18.0AD.
Diversified Optical Corporation: *See—*
Fantozzi, Louis R.; Kessler, Lawrence; and Draxler, Richard, 4,487,502, Cl. 356-125.000.
Dixon Automatic Tool, Inc.: *See—*
Dixon, Paul H., 4,487,541, Cl. 414-225.000.
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Dolzhenkov, Fedor E.: *See—*
Antonov, Veniamin V.; Bat, Jury I.; Gamalei, Edvin I.; Dolzhenkov, Fedor E.; Donskoi, Semen A.; Kulichenko, Valentin A.; Tischenko, Oleg I.; Shtepa, Evgeny D.; and Chervonenko, Viktor M., 4,487,397, Cl. 266-44.000.
Domaas, Perry M.: *See—*
Pichelman, Franklin D.; and Domaas, Perry M., 4,486,931, Cl. 29-81.00J.
Domeier, Linda A., to Union Carbide Corporation. Curable poly(acrylate) molding compositions containing a thermoplastic polymer low profile additive. 4,487,798, Cl. 428-288.000.
Dominguez, Richard J. G., to Texaco Inc. Reaction injection molded elastomers containing anhydrides. 4,487,908, Cl. 528-48.000.
Dominguez, Richard J. G.: *See—*
Zimmerman, Robert L.; and Dominguez, Richard J. G., 4,487,912, Cl. 528-52.000.
Donahoe, Patricia K.; Budzik, Gerald P.; and Mudgett-Hunter, Meredith, to General Hospital Corporation, The. Method of preparing hybridomas and of purifying immunogenic materials. 4,487,833, Cl. 435-172.200.
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Antonov, Veniamin V.; Bat, Jury I.; Gamalei, Edvin I.; Dolzhenkov, Fedor E.; Donskoi, Semen A.; Kulichenko, Valentin A.; Tischenko, Oleg I.; Shtepa, Evgeny D.; and Chervonenko, Viktor M., 4,487,397, Cl. 266-44.000.
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Antonov, Veniamin V.; Bat, Jury I.; Gamalei, Edvin I.; Dolzhenkov, Fedor E.; Donskoi, Semen A.; Kulichenko, Valentin A.; Tischenko, Oleg I.; Shtepa, Evgeny D.; and Chervonenko, Viktor M., 4,487,397, Cl. 266-44.000.
Donzis, Byron A., to Houston Protective Equipment, Inc. Multi-layered, open-celled foam shock absorbing structure for athletic equipment. 4,486,901, Cl. 2-2.000.
Dorband, Glen C.: *See—*
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Dorbath, Bernd; Schlodder, Rainer; and Giesecke, Norbert, to Degussa Aktiengesellschaft. Method and electrolytic bath for the deposition of low carat bright gold-silver alloy coatings. 4,487,664, Cl. 204-44.300.
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Dorner Mfg. Corp.: *See—*
Dorner, Wolfgang C., 4,487,309, Cl. 198-491.000.
Dorner, Wolfgang C., to Dorner Mfg. Corp. Conveyor system. 4,487,309, Cl. 198-491.000.
Dorsett, Terry E.; and Rininger, David P., to Diamond Shamrock Chemicals Company. Temperature resistant coating composite. 4,487,815, Cl. 428-219.000.
Doty, James H., II, to NCR Corporation. Sensing and logic for multiple bit per cell ROM. 4,488,065, Cl. 307-350.000.
Doughty, Ross: *See—*
Jones, Leonard W. N.; and Doughty, Ross, 4,487,538, Cl. 412-39.000.
Douglas, George H.: *See—*
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Bermudez, Mauricio; and Torres, Alberto L., 4,487,864, Cl. 524-2.000.
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Mixan, Craig E., 4,487,933, Cl. 546-302.000.
Peet, Norton P.; and Alexander, Catherine A., 4,487,930, Cl. 544-234.000.
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Mitchell, Darrell D., 4,487,905, Cl. 528-15.000.
Doyle, Terrence W.: *See—*
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Drake, Charles A., to Phillips Petroleum Company. Cleavage of hydroperoxides. 4,487,970, Cl. 568-342.000.
Dravo Corporation: *See—*
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Draxler, Richard: *See*—
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Drechsler, Mark A.; and Rutty, Edward C., to Stanley Works, The. Coilable tape rule with shifting hub, reel assembly therefor, and method of assembling. 4,487,379, Cl. 242-107.000.
Dreher, Gunther: *See*—
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Dresser Industries, Inc.: *See*—
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Drew Chemical Corporation: *See*—
Weiss, Charles O.; and Emerich, Dwight E., 4,487,745, Cl. 422-16.000.
Dreyfuss, Wilfried; Remp, Thomas E., Jr.; and Muller, Kurt. System for protecting machine threads. 4,487,229, Cl. 138-96.00T.
Dshkhunian, Valery L.; Kovalenko, Sergei S.; Mashevich, Pavel R.; and Telenkov, Vyacheslav V. Transistor storage. 4,488,264, Cl. 365-189.000.
Duble, Gerald R.: *See*—
McClellan, David P.; Duble, Gerald R.; and Hofferberth, William H., 4,488,133, Cl. 335-16.000.
duBourg, Jean-Pierre, to Patpan, Inc. Method and apparatus for drying moist skins. 4,487,041, Cl. 69-1.000.
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Dudley, Kenneth W.; Eves, E. Eugene, II; and Stone, William R., to Raytheon Company. Leakage suppression tunnel for conveyorized microwave oven. 4,488,027, Cl. 219-10.55A.
Duffer, Paul F.; Kelly, Joseph D.; and Franz, Helmut, to PPG Industries, Inc. Mixed acid stain inhibitor. 4,487,807, Cl. 428-422.000.
DuFort, Edward C.; and Uyeda, Harold A., to Hughes Aircraft Company. Geodesic dome-lens antenna. 4,488,156, Cl. 343-754.000.
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Dunn, James E.; Bradbury, Colin; Holmes, Kenneth R.; and Treadwell, Stephen W., to M/A-Com Linkabit, Inc. Distributed digital exchange with improved switching system and input processor. 4,488,290, Cl. 370-66.000.
Dunning, Leslie G. W.; and de Warrimont, Jean P. L. M. N., to Stamicarbon B.V., Licensing Subsidiary of DSM. Process for the production of an object from an ABS-polymer composition. 4,487,886, Cl. 525-86.000.
Du Pont de Nemours, E. I., and Company: *See*—
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Coughlin, James E.; Sommerfeld, Eugene G.; and Strolle, Clifford H., 4,487,909, Cl. 528-60.000.
England, David C.; and Resnick, Paul R., 4,487,668, Cl. 204-98.000.
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Zimmerman, William T., 4,487,626, Cl. 71-90.000.
Duracell Inc.: *See*—
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Slezak, Paul J.; Durand, Marcel J. P. E.; and Dunlop, Robert P., 4,487,169, Cl. 123-41.330.
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Lutjens, Robert D.; and Duron, Paul P., 4,487,256, Cl. 165-76.000.
Dusenberry, Gary L.: *See*—
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Dyckerhoff & Widmann Aktiengesellschaft: *See*—
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Dynametric, Inc.: *See*—
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E.I. Du Pont de Nemours and Company: *See*—
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E.M.E. System Aktiebolag: *See*—
Olofsson, Olof; and Larsson, Gunnar, 4,487,110, Cl. 92-93.000.
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Eastman Kodak Company: *See*—
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Eastport International, Inc.: *See*—
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Eaton Corporation: *See*—
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Zalewski, Jack J.; and Theurer, Walter C., 4,488,020, Cl. 200-76.000.
Ebihara, Heihachiro, to Citizen Watch Company Limited. Electro-acoustic transducer drive circuit for producing damped waveform envelope musical notes. 4,487,099, Cl. 84-1.260.
Ebihara, Kohei, to Hitachi, Ltd. Starter apparatus. 4,488,054, Cl. 290-38.00A.
Eckel Manufacturing Company, Inc.: *See*—
Neves, Billy W., 4,487,092, Cl. 81-57.180.
Eckenrode, Lewis A., Jr. Radiator vent valve. 4,487,392, Cl. 251-121.000.
Ecolochem, Inc.: *See*—
Dickerson, Richard C., 4,487,959, Cl. 560-248.000.
Edgecombe, Dale W.; and Webster, William L., to Edgecombe Enterprises International, Inc. Method and apparatus for growing and harvesting living organisms. 4,486,977, Cl. 47-59.000.
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Edgecombe, Dale W.; and Webster, William L., 4,486,977, Cl. 47-59.000.
Edwin Cooper, Inc.: *See*—
Lam, William Y., 4,487,706, Cl. 252-47.000.
Eggert, Walter S., Jr., to Budd Company, The. Primary suspension system for providing low vertical and longitudinal spring rates in a railway cap. 4,487,133, Cl. 105-224.100.
Eichelberger, Charles W.; and Wojnarowski, Robert J., to General Electric Company. Electrical conductor. 4,487,811, Cl. 428-546.000.
Eiermann, Dankwart, to Wankel GmbH. Rotary piston compressor. 4,487,561, Cl. 418-61.00A.
Eisenlohr, Karl-Heinz: *See*—
Simo, Thomas; and Eisenlohr, Karl-Heinz, 4,487,687, Cl. 208-56.000.
El-Aasser, Mohamed S.: *See*—
Shih, Yen-Jer; El-Aasser, Mohamed S.; and Vanderhoff, John W., 4,487,855, Cl. 523-201.000.
Elbe, Hans-Ludwig; Jautelat, Manfred; Buchel, Karl H.; Schaller, Klaus; and Plempel, Manfred, to Bayer Aktiengesellschaft. Azolyl-phenoxy-tetrahydrofuran-2-ylidene-methanes, a process for their preparation, and antimicrobial agents which contain these substances. 4,487,776, Cl. 424-269.000.
Election Data Corporation: *See*—
Stephens, Richard J.; and Boucher, Harry H., 4,488,034, Cl. 235-50.00A.
Electric Power Research Institute: *See*—
Netzel, Philip C.; and Spencer, Edward M., 4,487,660, Cl. 174-28.000.
Tahiliani, Vasu H., 4,487,746, Cl. 422-170.000.
Electric Power Research Institute, Inc.: *See*—
Rabinowitz, Mario; and Perry, E. Robert, 4,487,996, Cl. 174-105.00R.
Electro-Sensor, Inc.: *See*—
Shirey, Thomas F.; Serviss, William C.; and Young, Curtis H., Jr., 4,488,110, Cl. 324-133.000.
Electrolux S.a.r.l.: *See*—
Billen, Kurt, 4,486,981, Cl. 49-501.000.
Electronic Mechanical Products Co.: *See*—
Ost, Clarence S., 4,487,500, Cl. 355-44.000.
Elger, Walter: *See*—
Skuballa, Werner; Raduechel, Bernd; Schwarz, Norbert; Vorbrueggen, Helmut; and Elger, Walter, 4,487,953, Cl. 560-55.000.
Eli Lilly and Company: *See*—
Kirst, Herbert A.; and Toth, John E., 4,487,923, Cl. 536-7.100.
Ellen, Leonard W. Digital solid state recording of signals characterizing the playing of a musical instrument. 4,487,101, Cl. 84-462.000.
Ellett, William A. Method and apparatus for removing protective coating from pipe section. 4,487,643, Cl. 156-80.000.
Ellis, Paul E., Jr.: *See*—
Hsu, Chao-Yang; and Ellis, Paul E., Jr., 4,487,973, Cl. 568-454.000.
Ellis, William L. Bicycle sprocket shield. 4,487,424, Cl. 280-289.00G.
Ellwood, Henry, to USM Corporation. Method of and apparatus for storing and dispensing a mixture of particulate materials. 4,487,339, Cl. 222-236.000.
Emerich, Dwight E.: *See*—
Weiss, Charles O.; and Emerich, Dwight E., 4,487,745, Cl. 422-16.000.
Emeury, Jean-Marie L.: *See*—
Boileau, Jacques; Emeury, Jean-Marie L.; and Kehren, Jean-Paul, 4,487,938, Cl. 548-304.000.
Emmerich, Harold E.; and Richer, Larry A., to Gendron, Inc. Seat recliner adjustment mechanism. 4,487,453, Cl. 297-367.000.
Endler, Harvey M.: *See*—
Griffin, Edward L.; Endler, Harvey M.; and Young, Frederick A., 4,488,131, Cl. 333-205.000.
Energy Conversion Devices, Inc.: *See*—
Ovshinsky, Stanford R.; Sapru, Krishna; and Reger, Arie, 4,487,818, Cl. 429-44.000.
Engel, Douglas A. Puzzle amusement device. 4,487,417, Cl. 273-115.000.
Engelbrecht & Lemmerbrock GmbH & Co.: *See*—
Johanning, Hermann; and Aulbert, Heinz G., 4,487,542, Cl. 414-292.000.

Engelstein, Charles; Kassel, David L.; and Goodman, Harry, to Memory Protection Devices, Inc. Battery holder for coin cells. 4,487,820, Cl. 429-100.000.
Engineering & Research Associates, Inc.: *See*—
Acker, Loren C.; Taylor, Junius E.; and Minney, Stephen C., 4,488,028, Cl. 219-10.810.
Engl, Albert: *See*—
Kobler, Ingo; Stockel, Herbert; Mauer, Lutz; and Engl, Albert, 4,487,123, Cl. 101-216.000.
Kobler, Ingo; Stockl, Herbert; Meinke, Peter; Engl, Albert; and Hechler, Hatto, 4,487,124, Cl. 101-216.000.
England, David C.; and Resnick, Paul R., to Du Pont de Nemours, E. I., and Company. Fluorinated ion exchange polymer containing carboxylic groups, and film and membrane thereof. 4,487,668, Cl. 204-98.000.
English, Joseph: *See*—
Silvers, Richard A.; English, Joseph; and English, Lester, 4,487,194, Cl. 126-67.000.
English, Lester: *See*—
Silvers, Richard A.; English, Joseph; and English, Lester, 4,487,194, Cl. 126-67.000.
Enomoto, Hiroshi; Nomura, Akira; Aoyagi, Yoshiaki; and Ueda, Fusao, to Nippon Shinyaku Co., Ltd. Treatment of diseases of the liver, kidney, colon and rectum. 4,487,770, Cl. 424-249.000.
Enoxy Chimica S.p.A.: *See*—
Ascarelli, Paolo; Boccalon, Gianfranco; Moretti, Giuliano; Nistico', Nicola; and Pelacani, Alberto, 4,487,810, Cl. 428-461.000.
Enrini, Ferruccio, to Honeywell Information Systems Italia. Adjustable printer head drive. 4,487,518, Cl. 400-320.000.
Eouzan, Jean-Yves: *See*—
Claverie, Claude; and Eouzan, Jean-Yves, 4,488,305, Cl. 372-38.000.
Epchtein, Jacques S. Continuous process for the fermentation of must to produce wine or ethanol. 4,487,785, Cl. 426-15.000.
Epson Corporation: *See*—
Suzawa, Osamu, 4,487,481, Cl. 350-345.000.
ERNO Raumfahrttechnik GmbH: *See*—
Brandt, Manfred; and Kurmis, Viktor, 4,487,694, Cl. 210-242.300.
Erowa AG: *See*—
Liechti, Niklaus; and Schneider, Rudolf, 4,488,029, Cl. 219-69.00C.
Erstfeld, Thomas E., to United States of America, Air Force. Method for the preparation of epitaxial films of mercury cadmium telluride. 4,487,640, Cl. 148-175.000.
Eschmann, Joachim; and Zanzig, Jurgen, to International Standard Electric Corporation. Circuit arrangement for setting up a conference call. 4,488,291, Cl. 370-62.000.
Essex Group, Inc.: *See*—
Du Rocher, Daniel J., 4,487,369, Cl. 239-488.000.
Lane, Charles H.; and Whittington, James K., 4,487,990, Cl. 174-15.0WF.
Essig, Terrence L.; Huizinga, Donald D.; and Means, Donald R., to AT&T Bell Laboratories. Apparatus for controlling the application of telephone line power in a telephone set. 4,488,006, Cl. 179-81.00R.
Ethicon, Inc.: *See*—
Di Giovanni, John; Dorband, Glen C.; and Golden, Donald M., 4,487,205, Cl. 128-326.000.
Ethyl Corporation: *See*—
Everly, Charles R.; and Roper, Jerry M., 4,487,722, Cl. 260-465.00F.
Eugen Lutz GmbH & Co Maschinenfabrik: *See*—
Bergler, Otto, 4,487,240, Cl. 144-230.000.
Evana Tool and Engineering, Inc.: *See*—
Fuchs, Gilbert; Crowley, Norman; and Wink, Randall, 4,487,132, Cl. 104-166.000.
Evans, Gary A.: *See*—
Garmire, Elsa M.; Evans, Gary A.; and Niesen, Joseph W., 4,488,307, Cl. 372-50.000.
Evans, Morris L.: *See*—
Jagisch, Frank C.; and Evans, Morris L., 4,487,873, Cl. 524-158.000.
Everly, Charles R.; and Roper, Jerry M., to Ethyl Corporation. Method of preparing 4-(α-hydrocarbyl-α-cyanomethyl)2,6-di-substituted phenols. 4,487,722, Cl. 260-465.00F.
Evers, Richard W.: *See*—
Lloyd, William D.; and Evers, Richard W., 4,487,796, Cl. 428-154.000.
Eves, E. Eugene, II: *See*—
Dudley, Kenneth W.; Eves, E. Eugene, II; and Stone, William R., 4,488,027, Cl. 219-10.55A.
Ewing, John J.: *See*—
Claassen, George R.; and Ewing, John J., 4,487,623, Cl. 65-106.000.
Ex-Cell-O Corporation: *See*—
Hurst, Jeffrey B.; and Bradley, Jerome R., 4,487,220, Cl. 137-375.000.
Excel Industries, Inc.: *See*—
Mullet, David L.; Rilling, Raymond J.; and Voth, Elmer D., 4,487,007, Cl. 56-16.600.
Extracorporeal Medical Specialties, Inc.: *See*—
Lindemann, William T., 4,487,601, Cl. 604-122.000.
Troutner, Vernon H., 4,487,558, Cl. 417-477.000.
Exxon Research & Engineering Co.: *See*—
Bartz, Kenneth W., 4,487,870, Cl. 524-91.000.
Farcasiu, Dan, 4,487,976, Cl. 568-630.000.
Jagisch, Frank C.; and Evans, Morris L., 4,487,873, Cl. 524-158.000.
Spohn, Ralph J., 4,487,713, Cl. 260-453.00P.
Stogryn, Eugene L.; Ho, W. S. Winston; Montagna, Angelo A.; and Sartori, Guido, 4,487,967, Cl. 564-474.000.
Thomas, William R. L., 4,488,047, Cl. 250-486.100.
Wirnowski, Richard C., 4,488,158, Cl. 346-135.100.
Facet Enterprises, Incorporated: *See*—
Wiernicki, Michael V., 4,487,556, Cl. 417-417.000.
Fairchild Camera & Instrument Corp.: *See*—
Herndon, William H.; and Stinehelfer, Jonathan J., 4,488,263, Cl. 365-189.000.
Lehrer, William I., 4,488,166, Cl. 357-71.000.
Vaid, Hoshang, 4,488,297, Cl. 371-1.000.
Fall, James R. Exercise device and method. 4,487,413, Cl. 272-125.000.
Fancey, Everett G.; Peters, John V.; and Tucker, Russell E., to Nordco Limited. Longline baiting. 4,486,967, Cl. 43-4.500.
Fantozzi, Louis R.; Kessler, Lawrence; and Draxler, Richard, to Diversified Optical Corporation. Model EO 1000 multispectral computerized lens evaluation station. 4,487,502, Cl. 356-125.000.
Fapiano, Donald J., to General Electric Company. Friction compensation in a rolling mill having automatic gage control. 4,487,044, Cl. 72-8.000.
Farcasiu, Dan, to Exxon Research & Engineering Co. Etherification of phenol. 4,487,976, Cl. 568-630.000.
Faste, Heinrich; and Bindernagel, Ali, to Kocks Technik GmbH & Co. Chill casting methods. 4,487,247, Cl. 164-126.000.
Faucillon, Michel, to Allibert S.A. Shellfish traps. 4,486,973, Cl. 43-100.000.
Fay, Robert C.: *See*—
Scruggs, Major B.; and Fay, Robert C., 4,486,926, Cl. 26-13.000.
Fayter, Richard G., Jr.: *See*—
Hall, Allen L.; and Fayter, Richard G., Jr., 4,487,946, Cl. 549-474.000.
Feasny, Michael P.; and Cumins, David L., to Medical Designs, Inc. Brace for knee. 4,487,200, Cl. 128-80.00C.
Fedder, James L.; and Taylor, Attalee S., to AMP Incorporated. Card edge connector locking device. 4,487,468, Cl. 339-75.0MP.
Federal Signal Corporation: *See*—
Gosswiller, Earl W., 4,488,209, Cl. 362-386.000.
Feldmann, Rainer; and Scholten, Heinz, to Chemische Werke Huls AG. Powdered mixture of polyamides for heat sealing by the powder point process. 4,487,895, Cl. 525-432.000.
Felix, Raymond A., to Stauffer Chemical Company. Method for preparation of N-phosphonomethylglycine. 4,487,724, Cl. 260-502.50F.
Fellhauer, Michael; Holzinger, Otto; Vits, Klaus; and Wurst, Bert, to Robert Bosch GmbH. Computerized versatile and modular test system for electrical circuits. 4,488,299, Cl. 371-20.000.
Felly, Albert H. Underwater flower cutter. 4,486,905, Cl. 47-1.00R.
Ferguson, Robert W.: *See*—
Syme, Duncan C.; Caldwell, Eldon L.; Ferguson, Robert W.; Andors, Derik K.; and McLaughlin, Charles B., Jr., 4,487,195, Cl. 126-77.000.
Ferrara, Louis T. Blood separator and dispenser. 4,487,696, Cl. 210-399.000.
Ferrari, Roberto: *See*—
Scneghini, Gian L.; Ferrari, Roberto; Rizzotto, Vittorino; Omacini, Alberto; and Rossi, Carlo, 4,487,647, Cl. 156-181.000.
Fette, Charles J.: *See*—
Bogart, Frank J.; Dedisse, Mary R.; Divakaruni, Radhakrishna S.; Fette, Charles J.; Knight, Keith S.; Page, Karen L.; and Paxton, Thornton S., 4,488,004, Cl. 179-18.0AD.
Fiatallis North America, Inc.: *See*—
Jonnston, Kenneth W., 4,487,445, Cl. 296-65.00R.
Fiedler, Paul; and Braden, Rudolf, to Bayer Aktiengesellschaft. 3-Aminomethyl-1-(3-aminopropyl-1-methyl)-4-methylcyclohexane, a process for its preparation and its use. 4,487,966, Cl. 564-454.000.
Field, Jesse L., Jr., to Towmotor Corporation. Fluid operated system. 4,487,106, Cl. 91-436.000.
Field, John H., II, to Sigma Instruments Inc. Stepping motor. 4,488,069, Cl. 310-49.00A.
Finagin, Petr M.: *See*—
Danchenko, Valentin N.; Zayats, Alexandr A.; Potapov, Ivan N.; Finagin, Petr M.; and Kutsenko, Sergei P., 4,487,049, Cl. 72-208.000.
Finanziaria Lucchese S.p.A.: *See*—
Perini, Fabio, 4,487,377, Cl. 242-56.800.
Fiorini, Paul J. Sleeper seat. 4,487,451, Cl. 297-219.000.
Firmenich, SA: *See*—
Schulte-Elte, Karl-Heinrich; and Muller, Bernard, 4,487,944, Cl. 549-416.000.
Fischbeck, Kenneth H., to Xerox Corporation. Electrodeposition method for check valve. 4,487,662, Cl. 204-15.000.
Fischer, Benhardt B., Jr. Infant sling-type carrier. 4,487,346, Cl. 224-160.000.
Fischer, Klaus, to Klein, Schanzlin & Becker AG. Apparatus for securing expandable parts to supporting devices. 4,487,521, Cl. 403-24.000.
Fischer, Rudolf, to Albert-Frankenthal AG. Unit for parallelizing sheet-like products at the delivery end of a printing press. 4,487,408, Cl. 271-233.000.
Fischer, Werner; Kniss, Helmut; and Locher, Johannes, to Robert Bosch GmbH. Circuit for producing pulses indicative of speed from a rotary generator without timing shift. 4,487,059, Cl. 73-116.000.
Fisher Controls International, Inc.: *See*—
Burlage, Brian J.; Wiklund, David E.; and Lenz, Gary A., 4,487,076, Cl. 73-861.240.
Fisher, Gary H.; and Padgett, H. Patrick, to Industrial Sheet Metal & Mechanical Corp. Panel wall construction having airtight joint and method of forming same. 4,486,994, Cl. 52-303.000.

Fisher, Harland S.; Gendron, Wilfred H.; and Georgiades, Gregory, to Westvaco Corporation. Two way envelope. 4,487,360, Cl. 229-73.000.
Fisher, Jeremy F.; Mundy, Anthony C.; and Perry, Michael J., to Marconi Avionics Limited. Angular position sensors. 4,486,955, Cl. 33-262.000.
Fishler, Mark K.: *See*—
Cahoon, John B.; and Fishler, Mark K., 4,487,251, Cl. 164-475.000.
Fitz, Edward. Lung exercising device and method. 4,487,207, Cl. 128-728.000.
Flaherty, William J., to Mustang Units Co. Light aircraft engine muffler. 4,487,290, Cl. 181-256.000.
Fletcher, Charles J.; and Moshier, Everett, to Clawson Machine Company, Inc. Thermoelectric ice cube maker. 4,487,024, Cl. 62-3.000.
Flo-Pac Corporation: *See*—
Pichelman, Franklin D.; and Domaas, Perry M., 4,486,931, Cl. 29-81.00J.
FMC Corporation: *See*—
Lee, Fui-Tseng H., 4,487,968, Cl. 568-14.000.
McTamaney, Louis S.; Delfino, Allan B.; Waltrip, Delbert F.; and Kirkpatrick, Thomas I., 4,487,061, Cl. 73-151.000.
Plummer, Ernest L., 4,487,778, Cl. 424-275.000.
Focke & Co.: *See*—
Focke, Heinz; and Haenel, Klaus, 4,487,308, Cl. 198-412.000.
Focke, Heinz; and Haenel, Klaus, to Focke & Co. Apparatus for the transport of packs. 4,487,308, Cl. 198-412.000.
Fontaine, Marc F.: *See*—
Pittman, Robert W.; and Fontaine, Marc F., 4,487,260, Cl. 166-259.000.
Foote, Daniel J. Portable worktable. 4,487,134, Cl. 108-44.000.
Ford Aerospace & Communications Corporation: *See*—
Kay, Robert E., 4,487,813, Cl. 428-620.000.
Ford Motor Company: *See*—
Boueri, Elias T.; and Huntington, Dennis C., 4,487,303, Cl. 192-0.052.
Dickirson, Gene D., 4,487,437, Cl. 285-319.000.
Logothetis, Eleftherios M.; and Vassell, William C., 4,487,680, Cl. 204-426.000.
Forster, Josef: *See*—
Weber, Jakob; Forster, Josef; and Weber, Robert, 4,487,165, Cl. 122-392.000.
Forsyth, Eric B.; and Muller, Albert C., to United States of America, Energy. Fully synthetic taped insulation cables. 4,487,991, Cl. 174-25.00R.
Fory, Werner; Gass, Karl; Meyer, Willy; and Schurter, Rolf, to Ciba-Geigy Corporation. N-Phenylsulfonylcarbamates. 4,487,951, Cl. 560-12.000.
Foster, Craig A.; and Shaffer, John H., to Olin Corporation. Process for calcium hypochlorite. 4,487,751, Cl. 423-474.000.
Four Star Corporation: *See*—
Mareydt, Ray G., 4,487,348, Cl. 224-321.000.
Foye, David M., to Trane Company, The. Control for a variable capacity temperature conditioning system. 4,487,028, Cl. 62-115.000.
Franaszek, Peter A., to International Business Machines Corporation. Apparatus for encoding unconstrained data onto a (1,7) format with rate ½. 4,488,142, Cl. 340-347.0DD.
Frank, Wilhelm, to Wilh. Frank GmbH. Skylight. 4,486,978, Cl. 49-153.000.
Frankish, Norman W., to AEPLC. Constant level slurry tank. 4,487,160, Cl. 118-421.000.
Fransson, George E.: *See*—
Johnson, Stuart J.; and Fransson, George E., 4,487,535, Cl. 409-60.000.
Frantz, Gene A., to Texas Instruments Incorporated. Telephone answering apparatus with call-screening capabilities. 4,488,005, Cl. 179-18.00B.
Franz, Helmut: *See*—
Duffer, Paul F.; Kelly, Joseph D.; and Franz, Helmut, 4,487,807, Cl. 428-422.000.
Franz Kuhlmann Praezisionsmechanik und Maschinenbau GmbH & Co. KG: *See*—
Otten, Heinrich, 4,486,957, Cl. 33-438.000.
Franz Kuhlmann Prazisionsmechanik und Maschinenbau GmbH & Co. KG: *See*—
Jopt, Uwe, 4,486,958, Cl. 33-438.000.
Frasier, Donald J., to Howmet Turbine Components Corporation. System for locating cores in casting molds. 4,487,246, Cl. 164-32.000.
Frederick, John M.: *See*—
West, David W.; Hazel, Lonnie R.; and Frederick, John M., 4,487,113, Cl. 98-121.00R.
Free, John M.: *See*—
Murray, Paul M.; and Free, John M., 4,487,646, Cl. 156-177.000.
Freeman, Douglas A.: *See*—
Benson, John; Hanel, Harold L.; and Freeman, Douglas A., 4,487,353, Cl. 227-9.000.
Freeman, William T., to Polaroid Corporation. Computer graphic system with foreground/background discrimination. 4,488,244, Cl. 364-525.000.
Freeport Minerals Company: *See*—
Astley, Vivian C.; and Taravella, Jody J., 4,487,750, Cl. 423-321.00R.
Frei, Siegfried, to Cantec Inc. Method and apparatus for beading the bodies of sheet metal cans. 4,487,048, Cl. 72-94.000.
Freienstein, Bernd: *See*—
Kruger, H. Eckhard; Freienstein, Bernd; and Schafer, Thomas, 4,488,179, Cl. 358-181.000.
Freitag, Dieter: *See*—
Idel, Karsten; Freitag, Dieter; and Ostlianing, Edgar, 4,487,698, Cl. 210-639.000.
Freshwater, Lane A.; and Moynagh, Eugene E., Jr., to Minnesota Mining and Manufacturing Company. Socket connector. 4,487,471, Cl. 339-99.00R.
Frick, Douglas G.: *See*—
DeBold, Terry A.; Frick, Douglas G.; and Kutzamanis, John S., 4,487,744, Cl. 420-584.000.
Fried. Krupp Gesellschaft mit beschrankter Haftung: *See*—
Reiter, Norbert, 4,487,534, Cl. 407-114.000.
Fried, Peter I.: *See*—
Swersey, Burt L.; and Fried, Peter I., 4,487,276, Cl. 177-1.000.
Friedel, David G.; and Litjens, John J., to Brunswick Corporation. Skeg mounted vane steering system for marine drives. 4,487,587, Cl. 440-51.000.
Friedli, Paul; and Meyer, Fritz, to Inventio AG. Circuit arrangement for inputting control signals into a microcomputer system. 4,488,220, Cl. 364-200.000.
Friggstad Manufacturing Ltd.: *See*—
Friggstad, Terrance, 4,487,267, Cl. 172-310.000.
Friggstad, Terrance, to Friggstad Manufacturing Ltd. Agricultural apparatus with tool supported thereon and wheel adjustment structure therefor. 4,487,267, Cl. 172-310.000.
Frisbee, Claude M., to J. I. Case Company. Dozer blade angle adjustment mechanism. 4,487,269, Cl. 172-818.000.
Friton, Michael R., to Nike, Inc. Footwear with overlapping closure strap means. 4,486,965, Cl. 36-50.000.
Fritschel, Scott J., to Du Pont de Nemours, E. I., and Company. Polymer of TFE and f-alkyl ethylene. 4,487,902, Cl. 526-253.000.
Fritz, Alfred G., to United States of America, Navy. Stowage pack for controlled bomb/mine lanyard payout. 4,487,102, Cl. 89-1.550.
Froehlich, Peter, to Hilti Aktiengesellschaft. Drilling device for undercut boreholes. 4,487,275, Cl. 175-170.000.
Frost, Barry J. Bookmark. 4,487,156, Cl. 116-239.000.
Fruchey, Olan S., to Celanese Corporation. Separation and production of organic saturated monocarboxylic acids. 4,487,720, Cl. 260-419.000.
Fuchs, Gilbert; Crowley, Norman; and Wink, Randall, to Evana Tool and Engineering, Inc. Conveying system. 4,487,132, Cl. 104-166.000.
Fudo Construction Co., Ltd.: *See*—
Shono, Masaru; Kawakami, Takahiro; Matsumoto, Toshiyuki; Tamura, Thoru; and Matsumoto, Hideki, 4,487,524, Cl. 405-50.000.
Fuji Oil Company, Ltd.: *See*—
Gomi, Shimpei; Arai, Tomio; Takeuchi, Tomomitsu; Miwa, Shigeru; Takatsuka, Toru; and Watari, Ryuzo, 4,487,686, Cl. 208-48.00R.
Fuji Photo Film Co., Ltd.: *See*—
Inaba, Shozi, 4,487,491, Cl. 354-203.000.
Inoue, Eiichi; and Shimizu, Isamu, 4,488,083, Cl. 313-366.000.
Miyoshi, Takahito; Okutu, Toshimitu; Fujiyama, Masaaki; Tatsuta, Sumitaka; and Tuji, Nobuo, 4,487,802, Cl. 428-336.000.
Oishi, Kengo; and Suzuki, Osamu, 4,488,190, Cl. 360-97.000.
Oishi, Kengo; and Suzuki, Osamu, 4,488,191, Cl. 360-97.000.
Sato, Masamichi; Arai, Noboru; Sunaga, Yasumasa; and Inuiya, Masafumi, 4,488,039, Cl. 250-216.000.
Umemura, Shizuo; and Kitamoto, Tatsuji, 4,487,627, Cl. 75-0.5BA.
Fuji Photo Optical Co., Ltd.: *See*—
Sato, Masamichi; Arai, Noboru; Sunaga, Yasumasa; and Inuiya, Masafumi, 4,488,039, Cl. 250-216.000.
Fuji Standard Research: *See*—
Gomi, Shimpei; Arai, Tomio; Takeuchi, Tomomitsu; Miwa, Shigeru; Takatsuka, Toru; and Watari, Ryuzo, 4,487,686, Cl. 208-48.00R.
Fuji Xerox Co., Ltd.: *See*—
Kabashima, Akio, 4,487,406, Cl. 271-127.000.
Fujii, Hiroshi; Ishibashi, Akira; and Nando, Kenji, to Hitachi, Ltd. Motor controller. 4,488,100, Cl. 318-798.000.
Fujii, Teru: *See*—
Noguchi, Minori; Otsubo, Toru; Aiuchi, Susumu; Kamimura, Takashi; and Fujii, Teru, 4,487,678, Cl. 204-298.000.
Fujimori Kogyo Co., Ltd.: *See*—
Azuma, Tadashi, 4,487,315, Cl. 206-334.000.
Fujimoto, Kazuo: *See*—
Sugino, Takashi; Itoh, Kunio; Wada, Masaru; Shimizu, Hirokazu; Mizuno, Hiroyuki; and Fujimoto, Kazuo, 4,488,306, Cl. 372-46.000.
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Giesselbach, Marinus; and Giesselbach, Wendela, 4,486,961, Cl. 34-80.000.

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Gaughan, Roger G., to Phillips Petroleum Company. Purification. 4,487,979, Cl. 568-816.000.

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Emmerich, Harold E.; and Richer, Larry A., 4,487,453, Cl. 297-367.000.

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Fisher, Harland S.; Gendron, Wilfred H.; and Georgiades, Gregory, 4,487,360, Cl. 229-73.000.

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Archibald, James B.; and Rink, Frederick J., Jr., 4,488,072, Cl. 310-71.000.
Arendt, Ronald H., 4,487,755, Cl. 423-598.000.
Becker, Charles A., 4,487,993, Cl. 174-68.500.
Bloomer, Milton D., 4,488,199, Cl. 361-93.000.
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Mark, Victor; and Hedges, Charles V., 4,487,896, Cl. 525-439.000.
Mark, Victor, 4,487,917, Cl. 528-196.000.
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Orton, Ronald C., 4,488,078, Cl. 310-242.000.
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Hegadorn, Joseph L.; Chall, Steven B.; and Stevenson, Richard B., 4,487,023, Cl. 62-1.000.

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Donahoe, Patricia K.; Budzik, Gerald P.; and Mudgett-Hunter, Meredith, 4,487,833, Cl. 435-172.200.

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Griffin, Henry W., 4,487,448, Cl. 296-146.000.
Hoffman, Charles T., Jr., 4,487,297, Cl. 188-73.450.
Hopper, Daniel H., 4,487,063, Cl. 73-204.000.
Mitchell, Clarence I., 4,487,295, Cl. 188-72.600.
Perry, James C.; and Wright, Dolph D., 4,487,367, Cl. 239-112.000.
Reed, James R., 4,486,934, Cl. 29-163.50R.
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Georgiades, Gregory: *See*—
Fisher, Harland S.; Gendron, Wilfred H.; and Georgiades, Gregory, 4,487,360, Cl. 229-73.000.

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Maucher, Paul; and Geschka, Hugo-Werner, 4,487,173, Cl. 123-179.00J.

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Zison, Stanley W., 4,487,054, Cl. 73-19.000.

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Wurfel, Helmut, 4,487,684, Cl. 208-10.000.

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Berger, Antoine; and Gibert, Francois, 4,487,559, Cl. 418-25.000.

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Trotta, Robert A., 4,486,952, Cl. 30-47.000.
Gillis, Joseph P.; and Andrew, William G., to Kidde, Inc. Explosion suppression apparatus. 4,487,266, Cl. 169-51.000.
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Bellanger, Gilbert; and Giroux, Pierre, 4,487,670, Cl. 204-129.000.
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Hoyois, Jean-Claude, 4,487,197, Cl. 126-901.000.
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Pomeroy, Richard J., 4,487,060, Cl. 73-129.000.
Glenn, William E., to New York Institute of Technology. Apparatus for determining position and writing pressure. 4,488,000, Cl. 178-18.000.
Gnadinger, Alfred P.: *See*—
Ryden, William D.; Hanson, Matthew V.; Derbenwick, Gary F.; Gnadinger, Alfred P.; and Adams, James R., 4,486,943, Cl. 29-571.000.
Goan, John C., to Great Lakes Carbon Corporation. Reinforced polyester based resin system and method of fabrication. 4,487,863, Cl. 523-512.000.
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Gold, Joseph. Method of treating transplanted tumors and cancerous cachexia with quinolinic dihydrazide. 4,487,775, Cl. 424-266.000.
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Di Giovanni, John; Dorband, Glen C.; and Golden, Donald M., 4,487,205, Cl. 128-326.000.
Goldsmith, Herbert, to Pacific Scientific Instruments Company. Reflectance measuring instrument with integrating sphere. 4,487,504, Cl. 356-323.000.
Goldwasser, Edward M., to Small World Toys. Educational toy having fragrance association means. 4,487,585, Cl. 434-259.000.
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Gomi, Shimpei; Arai, Tomio; Takeuchi, Tomomitsu; Miwa, Shigeru; Takatsuka, Toru; and Watari, Ryuzo, to Fuji Oil Company, Ltd.; Fuji Standard Research; and Chiyoda Chemical Engineering & Construction Co., Ltd. Process of thermally cracking heavy hydrocarbon oils. 4,487,686, Cl. 208-48.00R.
Gonce, William P.; and Bilezikian, Edward S., to Londontown Corporation. Belt securing means. 4,486,904, Cl. 2-312.000.
Goodman, Harry: *See*—
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Goodyear Aerospace Corporation: *See*—
Chung, Daniel A., 4,487,913, Cl. 528-83.000.
Goosen, Mattheus F. A.; O'Shea, Geraldine M.; and Sun, Anthony M. F., to Connaught Laboratories Limited. Microencapsulation of living tissue and cells. 4,487,758, Cl. 424-21.000.
Goss, Gary J.: *See*—
Yu, Kin C.; and Goss, Gary J., 4,488,231, Cl. 364-200.000.
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Goto, Kunio: *See*—
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Gottschlich, Chad F.; Roblee, Leland H. S., Jr.; Seemann, Howard H.; Bates, William G.; and Spahr, Richard F., to Selas Corporation of America. Burner. 4,487,573, Cl. 431-348.000.
Gould, Kermit T. Fishing rod support and trigger. 4,486,968, Cl. 43-15.000.
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Graham, Douglas L.; and Graham, Mark L., to Solarcrete Corporation. Building structure and method of construction. 4,486,993, Cl. 52-262.000.
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Graham, Douglas L.; and Graham, Mark L., 4,486,993, Cl. 52-262.000.
Grandjacques, Benoit; Moirez, Jacques; Saint-Sevin, Michel; Biot, Michel; and Baluteau, Jean-Michel, to Sopelem. Refractometer using the limiting angle method. 4,487,503, Cl. 356-136.000.
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Shimp, David A.; and Graver, Richard B., 4,487,948, Cl. 549-552.000.
Gravure Research Institute, Inc.: *See*—
George, Harvey F.; and Oppenheimer, Robert H., 4,487,122, Cl. 101-153.000.
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Struger, Odo J.; and Gray, Jon F., 4,488,258, Cl. 364-900.000.
Grayson, Robert E. Locking capsule. 4,487,327, Cl. 220-8.000.
Great Lakes Carbon Corporation: *See*—
Goan, John C., 4,487,863, Cl. 523-512.000.
Grebe, Gerhard. Traveling grate for a furnace. 4,487,138, Cl. 110-269.000.
Green, Charles J., to GT Development Corporation. Gas venting valve. 4,487,215, Cl. 137-43.000.
Greener, Richard C. Cold storage cell for refrigeration system. 4,487,035, Cl. 62-406.000.
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Baird, Phillips C.; and Greenspan, Jay S., 4,487,999, Cl. 174-52.00S.
Greenterior Co., Ltd., The: *See*—
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Gregor, John S.: *See*—
Carrington, James E.; Gregor, John S.; and Westcott, Gerald R., 4,487,121, Cl. 101-93.140.
Greve, Lester B. Lifting attachments for cultivators. 4,487,268, Cl. 172-316.000.
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Griffin, Henry W., to General Motors Corporation. Unitized window assembly. 4,487,448, Cl. 296-146.000.
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Grimes, Gary J., to AT&T Bell Laboratories. Dynamic priority queue occupancy scheme for access to a demand-shared bus. 4,488,218, Cl. 364-200.000.
Grimes, William D.: *See*—
Waldo, David T.; Peterson, James L.; and Grimes, William D., 4,487,228, Cl. 138-96.00T.
Grohe, Klaus; and Paul, Volker, to Bayer Aktiengesellschaft. Combating fungi with novel (thio-)ureas, and novel intermediates therefor. 4,487,783, Cl. 424-322.000.
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Grover, Dennis J.; and West, David W., to Square D Company. Trim clamp assembly. 4,487,330, Cl. 220-324.000.
Gruber, Robert J.; and Knapp, John F., to Xerox Corporation. Conductive single component electrophotographic magnetic toner. 4,487,825, Cl. 430-106.600.
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Ciabatti, Romeo, 4,487,721, Cl. 260-465.00E.
GT Development Corporation: *See*—
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GTE Laboratories Incorporated: *See*—
Palilla, Frank C.; MacAllister, Burton W., Jr.; and McKenna, John F., 4,487,732, Cl. 264-61.000.
Palilla, Frank C.; MacAllister, Burton W., Jr.; and McKenna, John F., 4,487,733, Cl. 264-61.000.
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Muzeroll, Martin E.; Bonazoli, Robert; Waymouth, John F.; and Karlotski, Robert J., 4,488,091, Cl. 315-268.000.
Odozynski, John A., 4,488,128, Cl. 333-142.000.
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Rowe, Donald H., 4,488,040, Cl. 250-227.000.
Guderley, Bernd M. Copier. 4,487,498, Cl. 355-14.00R.
Guerrero, Michel; and Doret, Didier, to Socapex. Electric connection device for coupling multiple-conductor cables. 4,487,467, Cl. 339-49.00R.
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Gupta, Ashok K.; Gyarmati, Ernoe; Kreutz, Hermann; Muenzer, Rudolf; and Naoumidis, Aristides, to Kernforschungsanlage Julich GmbH. Binderless weld-bonding of presshaped sic-base parts into solid bodies. 4,487,644, Cl. 156-89.000.
Gustaffson, Petter: *See*—
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Gustavsson, Bo: *See*—
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Hague, James G., 4,486,998, Cl. 52-478.000.

Haack, Randall W.: *See*—
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Haag, Werner O.; and Whitehurst, Darrell D., to Mobil Oil Corporation. Production of oxygenated compounds. 4,487,972, Cl. 568-444.000.

Haagen, LeRoy G.: *See*—
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Haas, Rainer J.: *See*—
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Haferl, Peter E., to RCA Corporation. Electron beam suppression circuit for a television receiver. 4,488,181, Cl. 358-220.000.

Hagen, Karl; and Scholl, Karl H., to BASF Aktiengesellschaft. Manufacture of a molding from a thermoplastic powder or granular material. 4,487,722, Cl. 264-23.000.

Hagenmaier, Carl F., Jr.: *See*—
Bolton, Brent C.; Logsdon, Gary L.; Hagenmaier, Carl F., Jr.; and Wilson, Jesse R., 4,488,151, Cl. 340-825.500.

Hagi, Norio: *See*—
Oyama, Kiyotaka; Irino, Shigeaki; and Hagi, Norio, 4,487,717, Cl. 260-112.50R.

Hague, James G., to H. H. Robertson Company. Concealed fastener roof or wall structure and method of assembly. 4,486,998, Cl. 52-478.000.

Haines, Charles, Jr.; and Kent, Raymond C., to Armstrong World Industries, Inc. Vinyl covered sound absorbing structure. 4,487,793, Cl. 428-136.000.

Haines, Doug; Taylor, Keith; and Kaufman, Murlan, to Tektronix, Inc. Color shadow mask cathode ray tubes. 4,488,093, Cl. 315-375.000.

Hakkinen, Allan, to Innovex Oy. Battery cell for a primary battery. 4,487,821, Cl. 429-119.000.

Halcon SD Group, Inc., The: *See*—
Chang, Tsuan Y., 4,486,959, Cl. 34-9.000.

Hall, Allen L.; and Fayter, Richard G., Jr., to National Distillers and Chemical Corporation. Process for the isomerization of cyclopropyl ketones to 2,3-dihydrofurans. 4,487,946, Cl. 549-474.000.

Hall, David R.: *See*—
Nesbitt, Brenda F.; Hall, David R.; Lester, Ralph; and Marrs, Gordon J., 4,487,759, Cl. 424-32.000.

Hall, James R.; Harter, Donald P.; Clegg, Michael W.; and Gerber, James E., to APX Group, Inc. Process for making a replacement muffler. 4,486,932, Cl. 29-157.00R.

Haller, Kurt H.; Lieb, Carl; and Todoroff, Pete G., to Babcock & Wilcox Company, The. Start-up system for once-through boilers. 4,487,166, Cl. 122-406.0ST.

Halliburton Company: *See*—
Almond, Stephen W.; and Scott, Edith, 4,487,866, Cl. 524-42.000.
Almond, Stephen W.; and Scott, Edith, 4,487,867, Cl. 524-42.000.
Bridges, James R., 4,487,737, Cl. 376-119.000.
Hamid, Syed, 4,487,025, Cl. 62-54.000.

Hallstrom, Stig: *See*—
Brattstrom, Leif; Hallstrom, Stig; Gustavsson, Bo; and Mattsson, Kjell, 4,487,130, Cl. 102-476.000.

Halverson, James E. Chain saw bar with automatic tensioning. 4,486,953, Cl. 30-385.000.

Hama, Yoshihiro: *See*—
Itoh, Takayuki; and Hama, Yoshihiro, 4,487,482, Cl. 350-429.000.

Hamid, Syed, to Halliburton Company. Passive booster for pumping liquified gases. 4,487,025, Cl. 62-54.000.

Hamilton Kent Manufacturing Company, Inc.: *See*—
Housas, Jim; and Reto, Anthony J., 4,487,421, Cl. 277-207.00A.

Hamilton, Martin N. Conical wedge lock for cutter blade. 4,487,532, Cl. 407-37.000.

Hammond, Robert J., to Bendix Corporation, The. Vibration adjustable spacer. 4,487,300, Cl. 188-378.000.

Hampton, Clifton G.: *See*—
Dellinger, Thomas A.; and Hampton, Clifton G., 4,488,008, Cl. 179-81.00R.

Hampton, Michael J.: *See*—
Arnason, John D.; and Hampton, Michael J., 4,488,152, Cl. 340-870.370.

Hancock, Bruce J., to Hodson, Jack. Advertising sign system. 4,488,090, Cl. 315-201.000.

Hanel, Harold L.: *See*—
Benson, John; Hanel, Harold L.; and Freeman, Douglas A., 4,487,353, Cl. 227-9.000.

Hanko, Leonard: *See*—
Davis, Steven J.; and Hanko, Leonard, 4,488,311, Cl. 372-89.000.

Hansel, Otto; and Markwardt, Klaus, to Otto Hansel GmbH. Apparatus for continuous production of solid sugar compositions or the like. 4,487,118, Cl. 99-348.000.

Hansen, Irvin L.; and Haack, Randall W., to Westinghouse Electric Corp. Combination transformer with common core portions. 4,488,136, Cl. 336-215.000.

Hansen, Neils H.; and Haynes, Munro K., to International Business Machines Corporation. Buried servo recording system using phase encoded servo pattern. 4,488,188, Cl. 360-77.000.

Hanson, Matthew V.: *See*—
Ryden, William D.; Hanson, Matthew V.; Derbenwick, Gary F.; Gnadinger, Alfred P.; and Adams, James R., 4,486,943, Cl. 29-571.000.

Hara, Nobuo: *See*—
Hara, Toshio; and Hara, Nobuo, 4,487,097, Cl. 83-56.000.

Hara, Takeshi: *See*—
Kato, Yoshinori; Umemoto, Naoji; Takeda, Yumiko; and Hara, Takeshi, 4,487,714, Cl. 260-112.00B.

Hara, Tomihiro; Kagechika, Hiroshi; Doi, Satoshi; and Yomura, Yoshinori, to Nippon Kokan Kabushiki Kaisha. Steel sheets for preparing welded and coated cans and method for manufacturing the same. 4,487,663, Cl. 204-27.000.

Hara, Toshio; and Hara, Nobuo, to Hiromichi Hara. Method and machine for cutting by automatic band saw. 4,487,097, Cl. 83-56.000.

Harada, Kathleen L.: *See*—
Harada, Steve N.; and Harada, Kathleen L., 4,487,428, Cl. 280-648.000.

Harada, Steve N.; and Harada, Kathleen L. Convertible stroller. 4,487,428, Cl. 280-648.000.

Harada, Tuyoshi: *See*—
Kitamura, Yoshiaki; Nomura, Hitoshi; and Harada, Tuyoshi, 4,487,362, Cl. 236-12.200.

Hardee, Kim C., to Inmos Corporation. Method of making single poly memory cell. 4,486,944, Cl. 29-577.00C.

Hargrove, John: *See*—
Swaney, Richard E.; and Hargrove. John, 4,488,232, Cl. 364-200.000.

Harmon, Kevin E., to American Standard Inc. Static multi-color light signal. 4,488,207, Cl. 362-231.000.

Harreld, Donald R.; and Wiessner, Martin G., to Vonco Products, Inc. Inflatable novelty device. 4,486,975, Cl. 446-220.000.

Harris, Donald L., to Cordis Corporation. Implantable microinfusion pump system. 4,487,603, Cl. 604-152.000.

Harris, Robert W.: *See*—
Horvath, Richard L.; and Harris, Robert W., 4,487,550, Cl. 416-92.000.

Harris, Samuel C., to Genicom Corporation. Multiple action print head control circuit for a dot matrix printer. 4,487,515, Cl. 400-121.000.

Harrison, Anthony W., to Lucas Industries Limited. Combined live axles and disc brake assemblies for vehicles. 4,487,301, Cl. 192-4.00A.

Harrison, Don E.: *See*—
Pope, James M.; Harrison, Don E.; and Lahoda, Edward J., 4,487,711, Cl. 252-629.000.

Harrison, Gregory K., to Bendix Corporation, The. Four position control valve for a pneumatically operated servomotor. 4,487,105, Cl. 91-369.00A.

Harrison, Marc L., to AT&T Bell Laboratories. PLA-Based finite state machine with two-level control timing and same-cycle decision-making capability. 4,488,229, Cl. 364-200.000.

Harrison, Marc L., to AT&T Bell Laboratories. Programmed logic array with external signals introduced between its AND plane and its OR plane. 4,488,230, Cl. 364-200.000.

Harrison, Marc L., to AT&T Bell Laboratories. Integrated circuit chips with removable drivers and/or buffers. 4,488,267, Cl. 365-201.000.

Harrison, Thomas R.; and Tien, Ping K., to AT&T Bell Laboratories. Phototransistor for long wavelength radiation. 4,488,038, Cl. 250-211.00J.

Hart, John E.: *See*—
Ollis, Martin G.; and Hart, John E., 4,487,420, Cl. 273-423.000.

Harter, Donald P.: *See*—
Hall, James R.; Harter, Donald P.; Clegg, Michael W.; and Gerber, James E., 4,486,932, Cl. 29-157.00R.

Hartman, Robert J., to BASF Wyandotte Corporation. Polyoxyalkylene polyether polyols and polyurethane foams prepared therefrom. 4,487,854, Cl. 521-174.000.

Hartmann, Hans S., to Du Pont de Nemours, E. I., and Company. Preforms for reinforcement of battery grids. 4,487,792, Cl. 428-105.000.

Harvey Hubbell Incorporated: *See*—
Quiogue, Honesto D., 4,488,205, Cl. 362-223.000.

Harwood, Craig E., to Rockwell International Corporation. Miniature adjustable potentiometer clutch. 4,487,089, Cl. 74-531.000.

Hasegawa, Kenji: *See*—
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Hasegawa, Yasumasa: *See*—
Koike, Masaru; Hasegawa, Yasumasa; Shimosaka, Satoru; Aoyama, Nagara; and Yoshizumi, Toshihiko, 4,486,963, Cl. 34-116.000.

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Hashimoto, Taiki: *See*—
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Hassall, Cedric H.; Lawton, Geoffrey; and Moody, Christopher J., to Hoffmann-La Roche, Inc. Intermediates for pyrazolopyridazine derivatives. 4,487,929, Cl. 544-224.000.
Hatch, Marcus R.; and Lepsevich, William J., to Honeywell Inc. One dimensional scanning system. 4,487,473, Cl. 350-6.800.
Hatcher, Owen W., to Advanced Micro Devices, Inc. Process for forming and locating buried layers. 4,487,653, Cl. 156-644.000.
Hatta, Keiso, to Yoshida Kogyo K. K. Traverse take-up apparatus for material of indefinite length. 4,487,373, Cl. 242-16.000.
Hauni-Werke Korber & Co. KG.: *See*—
Tolasch, Gerhard; Schubert, Bernhard; and Menge, Gunter, 4,487,001, Cl. 53-151.000.
Hausmann, Robert H.; Cohen, Stuart B.; and Bandini, Arthur L., to International Telephone and Telegraph Corporation. Asynchronous digital TDM multiplexer-demultiplexer combination. 4,488,293, Cl. 370-84.000.
Havercroft, Peter: *See*—
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Hawker, Chifford G. Waste receptacle. 4,487,331, Cl. 220-405.000.
Hawkins, Gary F., to United States of America, Air Force. Method and apparatus for detecting acoustic emissions from metal matrix wire. 4,487,068, Cl. 73-587.000.
Hayasaka, Toshimi, to Olympus Optical Co., Ltd. Vertical illuminator for microscope. 4,487,486, Cl. 350-525.000.
Hayashi, Masayoshi: *See*—
Okada, Tokuhiro; Hayashi, Masayoshi; and Matsumoto, Hideaki, 4,488,248, Cl. 364-555.000.
Hayashi, Tomohiko: *See*—
Kawasaki, Hironobu; Sato, Takashi; Hayashi, Tomohiko; and Ozawa, Tsutomu, 4,487,812, Cl. 428-629.000.
Hayashibara, Toshio, to Hitachi, Ltd. Temperature control unit for vehicular air conditioning unit. 4,487,254, Cl. 165-16.000.
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Tieleman, Rudolf J.; and Hazenbroek, Jacobus E., 4,486,920, Cl. 17-52.000.
Head, Michael B.: *See*—
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Heady, Robert E.; and Alonso, Jorge H., to CPC International Inc. Process for making n-butyl butyrate. 4,487,832, Cl. 435-135.000.
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Allen, John H.; Portoghese, Joseph; Hebb, Richard C.; and Breglia, Denis R., 4,487,584, Cl. 434-44.000.
Hebden, Dennis; and Brooks, Charles T., to British Gas Corporation. Coal gasification plant. 4,487,612, Cl. 48-77.000.
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Heemstra, Frank W., to United States of America, Navy. Magnetic bridge proximity sensor. 4,488,113, Cl. 324-207.000.
Hefner, Robert E., Jr., to Dow Chemical Company, The. Hydroxy aromatic oligomers containing triazine and oxazoline groups and epoxy resins prepared therefrom. 4,487,915, Cl. 528-96.000.
Hegadorn, Joseph L.; Chall, Steven B.; and Stevenson, Richard B., to General Foods Corporation. Process for preparing a gasified ice product. 4,487,023, Cl. 62-1.000.
Hehl, Karl. Strain relief assembly for angular cable attachment. 4,487,386, Cl. 248-56.000.
Hehl, Karl. Injection molding machine with pivotable die closing unit. 4,487,569, Cl. 425-575.000.
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Heider, James E., to Owens-Illinois, Inc. Package for carrying two multicontainer packs. 4,487,312, Cl. 206-158.000.
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Held, Jimmy L.; Collins, Kenneth D.; and Mackelburg, Gerald R., to United States of America, Navy. Deep ocean wide band acoustic baffle. 4,488,271, Cl. 367-151.000.
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Helfrich, Clarence M.; and Helfrich, James C., 4,486,972, Cl. 43-88.000.
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Helms, Charles C.; and Atwood, John G., to Perkin-Elmer Corporation, The. Optical beam splitter. 4,487,477, Cl. 350-172.000.
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Bauriedel, Hans, 4,487,910, Cl. 528-65.000.
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Henry, Joseph P.: *See*—
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Hensen, William L. Reinforcing insert for hose end segment. 4,487,444, Cl. 285-114.000.
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Herden, Werner, to Robert Bosch GmbH. Pressure sensor with a hall element circuit. 4,487,074, Cl. 73-708.000.
Herndon, William H.; and Stinehelfer, Jonathan J., to Fairchild Camera & Instrument Corp. Bypass circuit for word line cell discharge current. 4,488,263, Cl. 365-189.000.
Herrington, F. John, to Mobil Oil Corporation. Method employing a splayed roll folder for adhesive application. 4,487,597, Cl. 493-221.000.
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Hester, Charles F.; and Casasent, David P., to United States of America, Air Force. Method of multivariant intraclass pattern recognition. 4,487,476, Cl. 350-162.130.
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Heymes, Rene, to Roussel Uclaf. 2-(2-Substitutedamino-4-thiazolyl)-2-(1-methoxy-isopropoxyimino)-acetic acids. 4,487,937, Cl. 548-194.000.
Heyward, Malcolm P.; and Young, Dennis, to British Petroleum Company, p.l.c. Catalyst composition for conversion of synthesis gas to hydrocarbons. 4,487,851, Cl. 518-728.000.
Hicks, Irwin A., to Singer Company, The. Internal gate rotary vane fluid meter with controlled rotor vane inner diameter. 4,487,064, Cl. 73-253.000.
Hidaka, Yoshiaki; and Niikura, Yasuhiro, to Nissan Motor Company, Limited. Variable-displacement rotary fluid compressor and air conditioning system using the compressor. 4,487,029, Cl. 62-133.000.

Higo, Kazuo: *See*—
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Himmele, Walter; Heberle, Wolfgang; Kohlmann, Friedrich-Wilhelm; and Wesenberg, Walter, to BASF Aktiengesellschaft. Trans-3-(4'-tert.-Butylcyclohex-1'yl)-2-methyl-1-dialkylaminopropanes, their preparation and their use as drugs. 4,487,965, Cl. 564-454.000.
Hiraga, Masaharu: *See*—
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Hirao, Tadashi, to Mitsubishi Denki Kabushiki Kaisha. Method of manufacturing semiconductor integrated circuit BI-MOS device. 4,486,942, Cl. 29-571.000.
Hirata, Yoshihiro; Miyake, Kuniaki; and Yakushiji, Hisao, to VLSI Technology Research Association. Semiconductor device manufacturing unit. 4,487,161, Cl. 118-723.000.
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Hladovcak, Raymond C.; and Keating, Walter W., to AT&T Technologies, Inc. Method of manufacturing printed circuit boards. 4,487,828, Cl. 430-313.000.
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Gerling, Erich; Schlusnus, Karl-Heinz; and Wahl, Hans-Jurgen, 4,487,070, Cl. 73-609.000.
Hoet, Roger, to Thomson-CSF. Method for the manufacture of a device ensuring an electrical and thermal contact between a plurality of metal surfaces, device obtained by this method, and use of said device. 4,488,086, Cl. 315-39.000.
Hofferberth, William H.: *See*—
McClellan, David P.; Duble, Gerald R.; and Hofferberth, William H., 4,488,133, Cl. 335-16.000.
Hoffman, Charles T., Jr., to General Motors Corporation. Caliper mounting suspension. 4,487,297, Cl. 188-73.450.
Hoffman, Frederick M. Scotch block attachment fitting. 4,487,396, Cl. 254-327.000.
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Hassall, Cedric H.; Lawton, Geoffrey; and Moody, Christopher J., 4,487,929, Cl. 544-224.000.
Hoge, Carl E., to Burroughs Corporation. Semiconductor die-attach technique and composition therefor. 4,487,638, Cl. 148-24.000.
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Buikema, Wolter, 4,488,213, Cl. 363-58.000.
Hollaway, Gerald C., Jr., to Dayco Corporation. Polymeric strip for a power transmission belt, belt made using such strip. 4,487,814, Cl. 428-57.000.
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Dunn, James E.; Bradbury, Colin; Holmes, Kenneth R.; and Treadwell, Stephen W., 4,488,290, Cl. 370-66.000.
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Feilhauer, Michael; Holzinger, Otto; Vits, Klaus; and Wurst, Bert, 4,488,299, Cl. 371-20.000.
Holzknecht, Robert H. Refrigeration leak sealant and method. 4,487,707, Cl. 252-68.000.
Homan, Gary R., to Dow Corning Corporation. One-part moisture cured aminosiloxanes. 4,487,883, Cl. 524-792.000.
Homfeldt, Kent D., to Illinois Tool Works Inc. Cut-off for clinch nut feed. 4,486,930, Cl. 29-33.00K.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Kawaguchi, Yoshiyuki, 4,487,170, Cl. 123-59.0PC.
Kudo, Hirokatsu, 4,487,349, Cl. 224-322.000.
Miyashita, Norio, 4,487,390, Cl. 248-396.000.
Wakatsuki, Goroei; Ohzono, Kohei; and Shibuya, Masanori, 4,487,282, Cl. 180-210.000.
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Suzuki, Masaaki; Izawa, Kenzi; and Kimura, Katsumi, 4,487,283, Cl. 180-219.000.
Tomita, Takao; and Kishizawa, Yuji, 4,487,285, Cl. 180-228.000.
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Baumann, Rainer, 4,488,080, Cl. 310-328.000.
Honeywell Inc.: *See*—
Aagard, Roger L., 4,487,206, Cl. 128-667.000.
Clay, Burton R.; and Thrailkill, William O., 4,488,042, Cl. 250-235.000.
Hatch, Marcus R.; and Lepsevich, William J., 4,487,473, Cl. 350-6.800.
Van Sloun, Peter H., 4,487,128, Cl. 102-261.000.
Honeywell Information Systems Inc.: *See*—
Miu, Ming T.; and Bradley, John J., 4,488,227, Cl. 364-200.000.
Yu, Kin C.; and Goss, Gary J., 4,488,231, Cl. 364-200.000.
Honeywell Information Systems Italia: *See*—
Enrini, Ferruccio, 4,487,518, Cl. 400-320.000.
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Rogers, Richard D.; and Hopkinson, Harold H., 4,487,031, Cl. 62-160.000.
Hopper, Daniel H., to General Motors Corporation. Solid state mass air flow sensor. 4,487,063, Cl. 73-204.000.
Horbelt, Michael; and Arnold, Herbert, to Robert Bosch GmbH. Control mechanism for fuel metering of a combustion engine. 4,487,189, Cl. 123-491.000.
Horey, Leonard J.; and Kurland, Marvin, to Singer Company, The. Method of checking the integrity of a source of additional memory for use in an electronically controlled sewing machine. 4,488,300, Cl. 371-21.000.
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Horiuchi, Mitsunori; Fukuda, Tatemi; Muramatsu, Shigeru; and Morita, Takayuki, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho.

Method and apparatus for supplying fluid to a traveling-type working machine serving a spinning frame. 4,487,012, Cl. 57-261.000.

Horvat, George T.; and Horvat, Stephen D. Auxiliary exhaust system. 4,487,137, Cl. 110-160.000.

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Horvath, Richard L.; and Harris, Robert W., to United States of America, Air Force. Cooled turbine blade tip closure. 4,487,550, Cl. 416-92.000.

Hosaka, Akio, to Nissan Motor Company, Limited. Method for confirming incorporation of a memory into microcomputer system. 4,488,257, Cl. 364-900.000.

Hosiden Electronics Co., Ltd.: *See—*
Hayashida, Kenji, 4,488,018, Cl. 200-6.00R.

Hosokawa, Kazutaka: *See—*
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Housas, Jim; and Reto, Anthony J., to Hamilton Kent Manufacturing Company, Inc. Pipe gasket with reinforcing means in its base self-energizing. 4,487,421, Cl. 277-207.00A.

Household Manufacturing Inc.: *See—*
Strader, Dennis L., 4,487,592, Cl. 464-88.000.

Houston Protective Equipment, Inc.: *See—*
Donzis, Byron A., 4,486,901, Cl. 2-2.000.

Howard, Edward G., Jr.: *See—*
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Howard, James K.: *See—*
Basire, Dominique; Bhattacharyya, Arup; Howard, James K.; and Mollier, Pierre, 4,488,262, Cl. 365-104.000.

Howlett, James J.: *See—*
Morrison, Terry; Howlett, James J.; and Zagranski, Raymond D., 4,488,236, Cl. 364-442.000.

Howmet Turbine Components Corporation: *See—*
Frasier, Donald J., 4,487,246, Cl. 164-32.000.

Hoxan Corporation: *See—*
Sakao, Nobuo; and Kuraoka, Yasuo, 4,487,033, Cl. 62-373.000.

Hoya Corporation: *See—*
Ishibai, Isao; and Kobayashi, Kunimitsu, 4,488,037, Cl. 250-204.000.

Hoyois, Jean-Claude, to Glaverbel. Solar control panel. 4,487,197, Cl. 126-901.000.

Hoyt, John G. Continuous reefing system. 4,487,147, Cl. 114-104.000.

Hrouda, Georges, to Nomel. Device for applying haemostatic clips. 4,487,204, Cl. 128-325.000.

Hsu, Chao-Yang; and Ellis, Paul E., Jr., to Sun Tech, Inc. Hydroformylation process with platinum (O) catalyst. 4,487,973, Cl. 568-454.000.

Huang, Leeyan: *See—*
Cole, Lucille J.; Huang, Leeyan; and Liesch, Jerrold M., 4,487,761, Cl. 424-118.000.

Huang, Yuchi, to Nicolet Instrument Corporation. Cryostat vessel wall spacing system. 4,487,332, Cl. 220-445.000.

Hubbard, John S. Towing vehicle. 4,487,544, Cl. 414-563.000.

Huber, Hans: *See—*
Bauer, Kurt; Hesch, Georg; Huber, Hans; Markert, Helmut; and Roth, Christian, 4,487,053, Cl. 72-335.000.

Huber, Siefried, to Black & Decker Inc. Electric tool, particularly a handtool, with torque control. 4,487,270, Cl. 173-12.000.

Huggins, Larry F.: *See—*
Kruse, James W.; Krutz, Gary W.; and Huggins, Larry F., 4,487,002, Cl. 56-10.200.

Hughes Aircraft Company: *See—*
DuFort, Edward C.; and Uyeda, Harold A., 4,488,156, Cl. 343-754.000.
Griffin, Edward L.; Endler, Harvey M.; and Young, Frederick A., 4,488,131, Cl. 333-205.000.
Swaney, Richard E.; and Hargrove, John, 4,488,232, Cl. 364-200.000.
Young, Frederick A.; Ahulii, Robert J.; and Rikimaru, Roy K., 4,488,130, Cl. 333-203.000.

Huizinga, Donald D.: *See—*
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Humphreys, Gordon R.: *See—*
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Maier-Hunke, Horst-Werner; Pfannkuch, Werner H. G.; and Viieler, Friedrich, 4,487,520, Cl. 402-65.000.

Hunter, Richard H.; and Heins, Karl, to Rondo Building Services Pty. Limited. Production of expanded metal parts. 4,486,927, Cl. 29-6.100.

Huntington Alloys, Inc.: *See—*
Smith, John S.; and Smith, Darrell F., Jr., 4,487,743, Cl. 420-459.000.

Huntington, Dennis C.: *See—*
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Tindall, Richard F.; Marshall, Leslie; and Hurlin, Stephen, 4,487,461, Cl. 312-323.000.

Hurst, Jeffrey B.; and Bradley, Jerome R., to Ex-Cell-O Corporation. Fuel distribution valve with thermal buffer member. 4,487,220, Cl. 137-375.000.

Hurt, John A., to Weaver & Hurt Limited. Rock drills. 4,487,274, Cl. 173-134.000.

Hurwitz, Scott L., to Magnum Shielding Corp. Anchoring braided metal sheath on ignition wire. 4,487,995, Cl. 174-74.00R.

Hutchin, Richard A., to Novon, Inc. Method and apparatus for range imaging. 4,488,172, Cl. 358-107.000.

Hutchins, Burleigh M.; and Abrahams, Louis, to Zymark Corporation. Robot system with interchangeable hands. 4,488,241, Cl. 364-513.000.

Hydril Company: *See—*
Roche, Joseph R., 4,487,434, Cl. 285-93.000.

Hydrometer GmbH: *See—*
Schmidt, Karl, 4,487,217, Cl. 137-110.000.

Hyne, James B.; and Tyrer, J. David, to Alberta Oil Sands Technology and Research Authority. Use of hydrogen-free carbon monoxide with steam in recovery of heavy oil at low temperatures. 4,487,264, Cl. 166-300.000.

Hynes, Richard O.; and Schwartz, Martin A., to Massachusetts Institute of Technology. Radio-labelled cross-linking reagents. 4,487,838, Cl. 436-504.000.

Ibata, Jyoji: *See—*
Nakajima, Nobuhiro; and Ibata, Jyoji, 4,487,875, Cl. 524-385.000.

Ibuki, Hideaki: *See—*
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Ichikawa, Hiroki: *See—*
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ICI Americas Inc.: *See—*
Kruse, Walter M.; and Stephen, John F., 4,487,977, Cl. 568-730.000.
Kruse, Walter M.; and Stephen, John F., 4,487,978, Cl. 568-730.000.

Idel, Karsten; Freitag, Dieter; and Ostlinning, Edgar, to Bayer Aktiengesellschaft. Extraction of onium salts from process waters and waste waters. 4,487,698, Cl. 210-639.000.

Igarashi, Hatsuhide: *See—*
Mukawa, Tojiro; and Igarashi, Hatsuhide, 4,488,061, Cl. 307-264.000.

Igel, Richard; Lutz, Alfons; Jardin, Hans; and Srdinko, Klaus-Peter, to Webasto-Werk W. Baier GmbH & Co. Vehicle roof closure panel assembly having pivotable retainer plates. 4,487,449, Cl. 296-216.000.

Iguchi, Satoru: *See—*
Nishie, Mitsuaki; Iguchi, Satoru; and Kono, Ichiro, 4,487,474, Cl. 350-96.210.

Iijima, Takeo, to Diesel Kiki Co., Ltd. Laminate type evaporator. 4,487,038, Cl. 62-515.000.

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Matsuoka, Naoki; Matsumoto, Hiroshi; Hori, Yutaka; Miki, Yoshio; Sano, Kenji; and Ijichi, Ichiro, 4,487,897, Cl. 526-64.000.

Ikari, Hideo; and Hirohata, Michio, to Canon Kabushiki Kaisha. Electromagnetically driven shutter. 4,487,493, Cl. 354-234.100.

Ikeda, Sakuji: *See—*
Kobayashi, Yukio; Shirakawa, Hideki; and Ikeda, Sakuji, 4,487,709, Cl. 252-500.000.

Illgner, Wolfram: *See—*
Rahlwes, Kurt; Illgner, Wolfram; and Reimann, Dieter, 4,486,991, Cl. 52-223.00L.

Illinois Tool Works Inc.: *See—*
Homfeldt, Kent D., 4,486,930, Cl. 29-33.00K.

Imai, Chikara: *See—*
Suzuki, Shigeru; Koizumi, Yutaka; Yanagawa, Nobuyuki; Hirakura, Koji; and Imai, Chikara, 4,487,501, Cl. 355-50.000.

Imai, Tamotsu, to UOP Inc. Synthesis of alkylaromatic compounds. 4,487,984, Cl. 585-454.000.

Imasco-CDC Research Foundation: *See—*
Saringer, John H., 4,487,199, Cl. 128-25.00R.

Imori, Hideo: *See—*
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In-Electronic: *See—*
Sherman, Henry, 4,488,009, Cl. 179-100.00D.

Inaba, Shozi, to Fuji Photo Film Co., Ltd. Film pressure plate. 4,487,491, Cl. 354-203.000.

Inagaki, Mitsuo; Takeda, Kenji; and Ito, Seitoku, to Nippon Soken, Inc. Rotary vane type compressor. 4,487,562, Cl. 418-84.000.

Inagami, Yasuhiro; Nagashima, Shigeo; Omoda, Koichiro; and Torii, Shunichi, to Hitachi, Ltd. Correction circuit for approximate quotient. 4,488,247, Cl. 364-765.000.

Industra Products, Inc.: *See—*
Walker, Robert G., 4,486,947, Cl. 29-734.000.

Industrial Sheet Metal & Mechanical Corp.: *See—*
Fisher, Gary H.; and Padgett, H. Patrick, 4,486,994, Cl. 52-303.000.

Inman, Billy E., to Milliken Research Corporation. Method to replace looper elements. 4,487,140, Cl. 112-79.00R.

Inmont Corporation: *See—*
Panush, Sol, 4,487,869, Cl. 524-90.000.

Inmos Corporation: *See—*
Hardee, Kim C., 4,486,944, Cl. 29-577.00C.
Ryden, William D.; Hanson, Matthew V.; Derbenwick, Gary F.; Gnadinger, Alfred P.; and Adams, James R., 4,486,943, Cl. 29-571.000.

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Inoue, Eiichi; and Shimizu, Isamu, to Fuji Photo Film Co., Ltd. Television camera tube using light-sensitive layer composed of amorphous silicon. 4,488,083, Cl. 313-366.000.
Inoue, Ryuzaburo; Tange, Shoji; and Nakagawa, Yasuhiko, to Nissan Motor Company, Limited. Fuel system for internal combustion engine. 4,487,188, Cl. 123-491.000.
Inspiration Consolidated Copper Company: *See*—,
Tittes, Allan F.; Larson, Kenneth H.; Burton, Elmer E.; and Britton, Kennith L., 4,487,399, Cl. 266-158.000.
Institut Gornogo Dela: *See*—
Smolyanitsky, Boris N.; Boginsky, Vladimir P.; Gileta, Vladimir P.; Syryamin, Jury N.; and Terskov, Alexei D., 4,487,273, Cl. 173-55.000.
Institut Organicheskogo Sinteza Akademii Nauk Latviiskoi: *See*—
Biseniex, Egils A.; Veveris, Maris M.; Dubur, Gunar Y.; Polis, Yanis J.; Uldrikis, Yan R.; Barmenkova, Natalia V.; and Kimenis, Agris A., 4,487,932, Cl. 546-285.000.
Institute of Gas Technology: *See*—
Macriss, Robert A.; and Zawacki, Thomas S., 4,487,027, Cl. 62-112.000.
Interdynamics, Inc.: *See*—
Trachtenberg, Joseph J., 4,488,033, Cl. 219-522.000.
International Business Machines Corporation: *See*—
Axmear, Frederick E.; Baxter, Duane W.; Saxman, John H.; and Siverling, Michael M., 4,488,189, Cl. 360-78.000.
Basire, Dominique; Bhattacharyya, Arup; Howard, James K.; and Mollier, Pierre, 4,488,262, Cl. 365-104.000.
Bond, George L.; Cartman, Frank P.; and Ryan, Philip M., 4,488,298, Cl. 371-11.000.
Carrington, James E.; Gregor, John S.; and Westcott, Gerald R., 4,487,121, Cl. 101-93.140.
Davis, Richard A.; Moss, Stanton K.; and Wang, Sang-Yen, 4,488,193, Cl. 360-98.000.
Franaszek, Peter A., 4,488,142, Cl. 340-347.0DD.
Hansen, Neils H.; and Haynes, Munro K., 4,488,188, Cl. 360-77.000.
Jambotkar, Chakrapani G., 4,488,162, Cl. 357-23.000.
Kotecha, Harish N., 4,488,265, Cl. 365-189.000.
Kraft, Wayne R.; Moore, Victor S.; Stahl, William L., Jr.; and Thoma, Nandor G., 4,488,067, Cl. 307-473.000.
Lemaire, Charles A.; and Luick, David A., 4,488,219, Cl. 364-200.000.
Martin, George N., 4,488,143, Cl. 340-347.0DD.
Mercy, Brian R., 4,488,259, Cl. 364-900.000.
Mitchell, Joan L.; and Pennebaker, William B., 4,488,174, Cl. 358-136.000.
Treseder, Robert C., 4,488,192, Cl. 360-98.000.
International Flavors & Fragrances Inc.: *See*—
Sprecker, Mark A.; Klemarczyk, Philip T.; and Belko, Robert P., 4,487,701, Cl. 252-8.600.
Yoshida, Takao; Katz, Ira; Warren, Craig B.; and Wiener, Charles, 4,487,613, Cl. 48-197.0FM.
International Paper Company: *See*—
Lavery, John J., 4,487,311, Cl. 206-43.310.
International Playtex, Inc.: *See*—
Patel, Shantilal G.; and Bell, William D., 4,487,040, Cl. 66-195.000.
International Standard Electric Corporation: *See*—
Eschmann, Joachim; and Zanzig, Jurgen, 4,488,291, Cl. 370-62.000.
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International Telephone and Telegraph Corporation: *See*—
Benson, John; Hanel, Harold L.; and Freeman, Douglas A., 4,487,353, Cl. 227-9.000.
Carter, Nicholas J. R.; Middleton, Francisco A.; and Das, Santanu, 4,488,287, Cl. 370-58.000.
Haussmann, Robert H.; Cohen, Stuart B.; and Bandini, Arthur L., 4,488,293, Cl. 370-84.000.
Krisher, Dale L.; and Chitsaz, Sirus, 4,488,255, Cl. 364-900.000.
Turbak, Albin F.; Snyder, Fred W.; and Sandberg, Karen R., 4,487,634, Cl. 106-203.000.
Interox Chemicals Limited: *See*—
Campbell, Ian M.; Baulch, Donald L.; and Chappel, Jonathan M., 4,487,988, Cl. 568-943.000.
Inuiya, Masafumi: *See*—
Sato, Masamichi; Arai, Noboru; Sunaga, Yasumasa; and Inuiya, Masafumi, 4,488,039, Cl. 250-216.000.
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Friedli, Paul; and Meyer, Fritz, 4,488,220, Cl. 364-200.000.
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IPL Systems, Inc.: *See*—
Ippolito, Stephen J.; Singer, Arthur L.; and Lambert, William J., 4,488,224, Cl. 364-200.000.
Ippolito, Stephen J.; Singer, Arthur L.; and Lambert, William J., to IPL Systems, Inc. System for controlling data flow. 4,488,224, Cl. 364-200.000.
Irino, Shigeaki: *See*—
Oyama, Kiyotaka; Irino, Shigeaki; and Hagi, Norio, 4,487,717, Cl. 260-112.50R.
Irvin Fallskarms AB: *See*—
Astrand, Harald V. G., 4,487,384, Cl. 244-152.000.
Irwin, David M., to Potters Supply Company, The. Superstructure for kiln car. 4,487,579, Cl. 432-241.000.
Irwin, Robert S., to E.I. Du Pont de Nemours and Company. Melt-spinnable copolyesters. 4,487,916, Cl. 528-193.000.
Isaac, Stanley N. Methods of and containers for igniting explosives. 4,487,129, Cl. 102-313.000.
Ishibai, Isao; and Kobayashi, Kunimitsu, to Hoya Corporation. Automatic focusing binocular. 4,488,037, Cl. 250-204.000.
Ishibashi, Akira: *See*—
Fujii, Hiroshi; Ishibashi, Akira; and Nando, Kenji, 4,488,100, Cl. 318-798.000.
Ishibashi, Tadao; and Kugimiya, Youichi, to Chisso Corporation. Polyolefin resin composition. 4,487,871, Cl. 524-100.000.
Ishida, Tokuzi: *See*—
Yokoyama, Hiroshi; and Ishida, Tokuzi, 4,487,185, Cl. 123-432.000.
Ishikawa, Isao; and Kanda, Hiroshi, to Hitachi, Ltd. Method of image display by ultrasonic microscope. 4,487,069, Cl. 73-606.000.
Ishikawa, Katsuji, to West Electric Co., Ltd. Automatic focusing apparatus using ultrasonic wave. 4,487,494, Cl. 354-401.000.
Ishikawa, Nobuo; and Taniguchi, Hiroki, to Daicel Chemical Industries, Ltd. Fluorine-containing cellulose derivatives. 4,487,926, Cl. 536-82.000.
Ishikawa, Shozo: *See*—
Katagiri, Kazuharu; Watanabe, Katsunori; Sakai, Kiyoshi; Ishikawa, Shozo; and Kitahara, Makoto, 4,487,824, Cl. 430-58.000.
Ishikawa, Yasuki, to Nissan Motor Company, Limited. Apparatus and method for starting a diesel engine using plasma ignition plugs. 4,487,177, Cl. 123-260.000.
Isobe, Toshiaki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Electronic fuel injecting method and device for internal combustion engine. 4,487,190, Cl. 123-492.000.
Isotronics, Inc.: *See*—
Baird, Phillips C.; and Greenspan, Jay S., 4,487,999, Cl. 174-52.00S.
Isover Saint-Gobain: *See*—
Battigelli, Jean A.; and Berthier, Guy, 4,487,622, Cl. 65-4.400.
Isozumi, Shuuzo, to Mitsubishi Denki Kabushiki Kaisha. Engine starter. 4,487,174, Cl. 123-179.00J.
Ito, Koichi: *See*—
Sakuta, Masaharu; Kiya, Soichi; Uchizaki, Iwao; Yoshioka, Yasuhiko; Ito, Koichi; Saito, Toshio; Kaya, Tadahiro; Shioya, Tsunetoshi; and Shimoyama, Yoshifumi, 4,487,633, Cl. 106-90.000.
Ito, Ryoichi; Murakami, Osamu; Nakamura, Masayuki; Higo, Kazuo; and Ueno, Kengi, to Kubota, Ltd. Engine with a rotary-speed control apparatus and an emergency halt apparatus. 4,487,180, Cl. 123-333.000.
Ito, Seitoku: *See*—
Inagaki, Mitsuo; Takeda, Kenji; and Ito, Seitoku, 4,487,562, Cl. 418-84.000.
Ito, Yoichiro, to United States of America, Health and Human Services. Multi-layer coil countercurrent chromatograph with adjustable revolutional radius. 4,487,693, Cl. 210-198.200.
Itoh, Kunio: *See*—
Shimizu, Hirokazu; Itoh, Kunio; Wada, Masaru; Sugino, Takashi; and Okabe, Takako, 4,488,304, Cl. 372-36.000.
Sugino, Takashi; Itoh, Kunio; Wada, Masaru; Shimizu, Hirokazu; Mizuno, Hiroyuki; and Fujimoto, Kazuo, 4,488,306, Cl. 372-46.000.
Itoh, Masahiko; Midorikawa, Heihatiro; Minato, Akira; and Machizawa, Kenzi, to Hitachi, Ltd. Hermetically circulating, absorption type refrigerator. 4,487,036, Cl. 62-474.000.
Itoh, Takayuki; and Hama, Yoshihiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Stop down structure for facsimile zoom lens. 4,487,482, Cl. 350-429.000.
ITT Industries, Inc.: *See*—
Bauer, Kurt; Hesch, Georg; Huber, Hans; Markert, Helmut; and Roth, Christian, 4,487,053, Cl. 72-335.000.
Colley, Jacques L. J.; and Vrydags, Andre P. J., 4,487,117, Cl. 99-341.000.
Lerouge, Claude P. H., 4,488,253, Cl. 364-786.000.
Ives, Andrew P.: *See*—
Moore, John H.; and Ives, Andrew P., 4,487,181, Cl. 123-357.000.
Iwafune, Yasuo, to Tokyo Kogaku Kikai Kabushiki. Level measuring instrument having a staff with light-emitting elements. 4,488,050, Cl. 250-578.000.
Iwahashi, Haruo: *See*—
Tarumi, Noriyoshi; Iwahashi, Haruo; Matsunawa, Masahiko; and Tokunaga, Hiroshi, 4,488,160, Cl. 346-154.000.
Iwaki, Yoshiyuki; Imori, Hideo; and Gotou, Hitoshi, to Mitsubishi Denki Kabushiki Kaisha. Alternating current generator for a car having a multi part partition plate for aiding a cooling fan. 4,488,070, Cl. 310-62.000.
Iwamoto, Kuniharu, to Toyota Jidosha Kabushiki Kaisha. Press apparatus. 4,487,051, Cl. 72-312.000.
Iwanami, Teruo; and Hasegawa, Kenji, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Process for forming film of hydrolyzed ethylene-vinyl acetate copolymer. 4,487,789, Cl. 427-407.100.
Iwase, Takatoshi; and Nakagawa, Akira, to Nippondenso Co., Ltd. Apparatus for assembling core for heat exchanger. 4,486,933, Cl. 29-157.30A.
Iwatschenko, Peter; and Giebler, Fritz, to Pfrimmer-Viggo GmbH & Co. KG. Apparatus for dispensing nutritional substances enterically. 4,487,604, Cl. 604-153.000.
Iwaya, Shoichi: *See*—
Adachi, Hiromi; and Iwaya, Shoichi, 4,488,087, Cl. 315-101.000.
Izawa, Kenzi: *See*—
Suzuki, Masaaki; Izawa, Kenzi; and Kimura, Katsumi, 4,487,283, Cl. 180-219.000.
J. I. Case Company: *See*—
Frisbee, Claude M., 4,487,269, Cl. 172-818.000.

Jackson, Alan T.; and Henderson, William D., to Otis Engineering Corporation. Hydraulically set well packer. 4,487,258, Cl. 166-120.000.

Jackson, Robert E., to PDA Engineering. Laser protection device. 4,487,478, Cl. 350-622.000.

Jaffe, Mary S.; and Sterling, Vaughn C., to General Electric Company. Switching device for photoflash unit. 4,487,574, Cl. 431-359.000.

Jagenberg AG: *See*—
Schonmeier, Herbert, 4,487,545, Cl. 414-684.000.

Jagenberg Aktiengesellschaft: *See*—
Mohn, Hans-Werner; and Rosenberg, Heinz-Jurgen, 4,487,650, Cl. 156-567.000.

Jager, Gernot; Spitz, Hubert; and Specht, Herbert, to Klockner-Humboldt-Deutz AG. Method and apparatus for monitoring rotary drums during thermal processing. 4,487,575, Cl. 432-1.000.

Jagisch, Frank C.; and Evans, Morris L., to Exxon Research & Engineering Co. Aqueous emulsions of high softening point hydrocarbon resins and process for preparing the same. 4,487,873, Cl. 524-158.000.

Jambotkar, Chakrapani G., to International Business Machines Corporation. Self-aligned metal field effect transistor integrated circuits using polycrystalline silicon gate electrodes. 4,488,162, Cl. 357-23.000.

James Burn Bindings Limited: *See*—
Jones, Leonard W. N.; and Doughty, Ross, 4,487,538, Cl. 412-39.000.

Jamet, Daniel: *See*—
Petit, Andre ; and Jamet, Daniel, 4,487,466, Cl. 339-32.00M.

Jan Al, Rene ; and Krise, John W., Jr., to Dresser Industries, Inc. Process for electrophoretic film deposition achieving increased film thickness. 4,487,674, Cl. 204-181.00R.

Janda, Helmut: *See*—
Schiele, August; and Janda, Helmut, 4,487,104, Cl. 89-34.000.

Jani, William. Cement staging apparatus for wells and including well casing and a process therefor. 4,487,263, Cl. 166-289.000.

Jannel & Son Body Company: *See*—
O'Bar, Edward J., 4,486,980, Cl. 49-449.000.

Janutka, William J., to Eaton Corporation. Gating circuit for combining series and parallel connected FETs. 4,487,457, Cl. 307-242.000.

Janutka, William J., to Eaton Corporation. Bidirectional source to source stacked FET gating circuit. 4,487,458, Cl. 307-577.000.

Janutka, William J., to Eaton Corporation. Bidirectional drain to drain stacked FET gating circuit. 4,488,068, Cl. 307-570.000.

Japan Synthetic Rubber Co., Ltd.: *See*—
Ohmori, Toshio; and Yamamoto, Mineo, 4,487,892, Cl. 525-237.000.

Jardin, Hans: *See*—
Igel, Richard; Lutz, Alfons; Jardin, Hans; and Srdinko, Klaus-Peter, 4,487,449, Cl. 296-216.000.

Jasensky, Richard J.: *See*—
Kicinski, Kenneth J.; Printiss, Frederick H., Sr.; and Jasensky, Richard J., 4,487,289, Cl. 181-252.000.

Jautelat, Manfred: *See*—
Elbe, Hans-Ludwig; Jautelat, Manfred; Buchel, Karl H.; Schaller, Klaus; and Plempel, Manfred, 4,487,776, Cl. 424-269.000.

Jaycor: *See*—
Brucker, Stephen E.; and Blankenship, Larry K., 4,487,583, Cl. 434-22.000.

Jebens, Robert W., to RCA Corporation. Video disc player having improved caddy extraction mechanism. 4,488,280, Cl. 369-77.200.

Jeffers, Edward A.; McLeroy, R. Philip; and Sacerio, Jose L., to Control Power Systems Inc. Halogen gas leak detector. 4,488,118, Cl. 324-455.000.

Jelinek, Jan: *See*—
Malek, Zdenek; Jelinek, Stanislav; Belling, Alexandr; Matena, Vladimir; and Jelinek, Jan, 4,487,253, Cl. 165-11.00R.

Jelinek, Stanislav: *See*—
Malek, Zdenek; Jelinek, Stanislav; Belling, Alexandr; Matena, Vladimir; and Jelinek, Jan, 4,487,253, Cl. 165-11.00R.

JEOL Ltd.: *See*—
Anazawa, Norimichi; Okunuki, Masahiko; and Aihara, Ryuzo, 4,488,045, Cl. 250-423.00R.

Jespersen, Paul W.: *See*—
Rasmussen, Holger; Jespersen, Paul W.; and DeLuca, Raymond F., 4,487,375, Cl. 242-55.300.

Jeumont-Schneider: *See*—
Salmon, Jean P., 4,487,385, Cl. 246-122.00R.

Jeumont-Schneider Corporation: *See*—
Salmon, Jean P.; and Laurent, Daniel M., 4,488,238, Cl. 364-483.000.

Jobert, Claude; and Jobert, Suzanne. Toilet for cats and other small animals. 4,487,163, Cl. 119-1.000.

Jobert, Suzanne: *See*—
Jobert, Claude; and Jobert, Suzanne, 4,487,163, Cl. 119-1.000.

Johanning, Hermann; and Aulbert, Heinz G., to Engelbrecht & Lemmerbrock GmbH & Co. Gastight high-rise silos. 4,487,542, Cl. 414-292.000.

Johansson, Hans A. V. Hoisting gear at patient-lifting devices. 4,487,019, Cl. 60-481.000.

Johnson, Russell W.: *See*—
Robinson, Delmar W.; Johnson, Russell W.; and Moser, Marl D., 4,487,848, Cl. 502-223.000.

Johnson Service Company: *See*—
Schoenke, Ronald O., 4,486,919, Cl. 16-366.000.

Johnson, Stuart J.; and Fransson, George E., to Barber-Colman Company. Gear shaping machine. 4,487,535, Cl. 409-60.000.

Johnston, James R.; and Meiste, Cordell E., to National Manufacturing Co. Door closer with a compressible braking sleeve. 4,486,917, Cl. 16-70.000.

Johnstone, Richard, to Kearney & Trecker Corporation. Ball nut having adustable preloading. 4,487,087, Cl. 74-424.80A.

Jones, David E., to Apache Chemicals, Inc. Thermoelectric temperature controller for liquid chemical bubbler containers. 4,487,619, Cl. 62-3.000.

Jones, Leonard W. N.; and Doughty, Ross, to James Burn Bindings Limited. Binding machines. 4,487,538, Cl. 412-39.000.

Jonnston, Kenneth W., to Fiatallis North America, Inc. Crawler tractor seat pivotable to right of center. 4,487,445, Cl. 296-65.00R.

Jopke, Walter H., Jr.; and Shier, John S., to Control Data Corporation. Method for using titanium-tungsten alloy as a barrier metal in silicon semiconductor processing. 4,486,946, Cl. 29-590.000.

Jopt, Uwe, to Franz Kuhlmann Prazisionsmechanik und Maschinenbau GmbH & Co. KG. Drawing head. 4,486,958, Cl. 33-438.000.

Joyner, Frederick B.: *See*—
Trotter, Jimmy R.; Joyner, Frederick B.; and McConnell, Richard L., 4,487,919, Cl. 528-272.000.

Junge, Richard C., to Lamb-Weston, Inc. Starch enrobing process for coating frozen food. 4,487,786, Cl. 426-302.000.

Juvinall, John W., to Owens-Illinois, Inc. Method for inspecting glass containers. 4,487,322, Cl. 209-526.000.

Kabashima, Akio, to Fuji Xerox Co., Ltd. Cassette type apparatus for feeding papers. 4,487,406, Cl. 271-127.000.

Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo: *See*—
Miyake, Toshio; Sakai, Shuzo; and Shibuya, Takashi, 4,487,198, Cl. 127-46.300.

Kabushiki Kaisha Ishida Koki Seisakusho: *See*—
Morita, Souji; and Mikami, Yoshiharu, 4,487,277, Cl. 177-25.000.

Kabushiki Kaisha Kawai Gakki Seisakusho: *See*—
Mishima, Toshio, 4,487,098, Cl. 84-1.030.

Kabushiki Kaisha Komatsu Seisakusho: *See*—
Shiotsubo, Masami; Yamamuro, Toshikazu; and Saito, Hiroshi, 4,487,525, Cl. 405-184.000.

Kabushiki Kaisha Naka Gijutsu Kenkyusho: *See*—
Naka, Hiromitsu, 4,486,987, Cl. 52-179.000.

Kabushiki Kaisha Orii Jidoki Seisakusho: *See*—
Orii, Masaru, 4,487,409, Cl. 271-267.000.

Kabushiki Kaisha Tokai-Rika-Denki Seisakusho: *See*—
Kubota, Tatsuhi, 4,487,381, Cl. 242-107.000.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Horiuchi, Mitsunori; Fukuda, Tatemi; Muramatsu, Shigeru; and Morita, Takayuki, 4,487,012, Cl. 57-261.000.

Kabushikigaisha Nishizawa: *See*—
Nishizawa, Akitoshi, 4,487,426, Cl. 280-609.000.

Kafchinski, Ronald: *See*—
Chenevey, Edward C.; and Kafchinski, Ronald, 4,487,735, Cl. 264-85.000.

Kagechika, Hiroshi: *See*—
Hara, Tomihiro; Kagechika, Hiroshi; Doi, Satoshi; and Yomura, Yoshinori, 4,487,663, Cl. 204-27.000.

Kagitani, Kazuhiro; Yoshitsugu, Seikichi; and Mizusawa, Akira, to Nissan Motor Co., Ltd.; and Nifco Inc. Molding clip. 4,486,985, Cl. 52-127.700.

Kajiwara, Tetsuo; Hashimoto, Kazuyoshi; Kawanami, Takao; and Mori, Koichi, to Mitsubishi Jokogyo Kabushiki Kaisha; and Nippon Steel Corporation. Rolling mill. 4,487,050, Cl. 72-243.000.

Kaken Chemical Co. Ltd.: *See*—
Yoko, Kusakabe; and Taku, Mizuno, 4,487,762, Cl. 424-120.000.

Kalama Chemical, Inc.: *See*—
Marinak, Michael J.; and Simonson, John L., 4,487,935, Cl. 546-345.000.

Kamata, Hideaki: *See*—
Ueno, Susumu; and Kamata, Hideaki, 4,487,880, Cl. 524-495.000.

Kamens, Bruce H., to Timex Medical Products Corporation. Fast response thermoresistive temperature sensing probe. 4,487,208, Cl. 128-736.000.

Kamentsky, Louis A., to Ortho Diagnostic Systems Inc. Immunoassay methods employing patterns for the detection of soluble and cell surface antigens. 4,487,839, Cl. 436-518.000.

Kamimura, Takashi: *See*—
Noguchi, Minori; Otsubo, Toru; Aiuchi, Susumu; Kamimura, Takashi; and Fujii, Teru, 4,487,678, Cl. 204-298.000.

Kamimura, Yoshihiko: *See*—
Onojima, Yoshio; Yoneda, Kenichi; Kamimura, Yoshihiko; Shimada, Akira; and Noguchi, Masahiko, 4,487,748, Cl. 423-240.000.

Kaminsky, George J., to Procter & Gamble Company, The. Granular detergents containing anionic surfactant and ethoxylated surfactant solubility aid. 4,487,710, Cl. 252-546.000.

Kamiya, Kazuhiro: *See*—
Watanabe, Isamu; Kamiya, Kazuhiro; and Mori, Toshihito, 4,487,924, Cl. 536-16.100.

Kanao, Shiro. Doubled-walled corrugated synthetic resin pipe. 4,487,232, Cl. 138-122.000.

Kanatani, Yoshiharu, to Sharp Corporation. Drive circuit for video display panel. 4,488,150, Cl. 340-781.000.

Kanda, Hiroshi: *See*—
Ishikawa, Isao; and Kanda, Hiroshi, 4,487,069, Cl. 73-606.000.

Kanda, Osamu: *See*—
Kuroda, Hiroshi; Nishimura, Tsukasa; Hashimoto, Taiki; Nishimura, Masakatsu; Kanda, Osamu; and Nozawa, Shigeru, 4,487,784, Cl. 423-555.000.

Kanegafuchi Chemical Industry Co., Ltd.: *See*—
Kato, Shinji; Uku, Kyouji; and Morikawa, Hisashi, 4,487,898, Cl. 526-65.000.
Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Kobayashi, Osamu, 4,487,731, Cl. 264-51.000.
Kaneko, Takushi: *See*—
Vyas, Dolatrai M.; Kaneko, Takushi; and Doyle, Terrence W., 4,487,769, Cl. 424-246.000.
Kano, Tokio: *See*—
Takayanagi, Akitoshi; and Kano, Tokio, 4,487,836, Cl. 436-2.000.
Kanter, Robert J., to Technicon Instruments Corporation. Method and apparatus for separating lymphocytes from anticoagulated blood. 4,487,700, Cl. 210-789.000.
Kao Soap Co., Ltd.: *See*—
Yamamoto, Hiromi; and Okumura, Takeo, 4,487,760, Cl. 424-70.000.
Kapadia, Nikul S.; and Ray, David J., to Becton, Dickinson and Company. Vibration monitoring system for aircraft engines. 4,488,240, Cl. 364-508.000.
Kapicak, Louis A.: *See*—
Ream, Bernard C.; Henry, Joseph P.; and Kapicak, Louis A., 4,487,958, Cl. 560-204.000.
Karidis, Peter G., to United States of America, Energy. Hydraulic flow visualization method and apparatus. 4,487,075, Cl. 73-861.050.
Karkkainen, Martti; and Martti, Lauri, to Raha-Automaattiyhdistys. Coin operated prize dispensing projecting game. 4,487,414, Cl. 273-371.000.
Karl Mayer Textilmaschinenfabrik GmbH: *See*—
Mayer, Ingo, 4,487,039, Cl. 66-84.00A.
Karlotski, Robert J.: *See*—
Muzeroll, Martin E.; Bonazoli, Robert; Waymouth, John F.; and Karlotski, Robert J., 4,488,091, Cl. 315-268.000.
Kashima Oil Company Limited: *See*—
Watanabe, Masami, 4,487,685, Cl. 208-44.000.
Kashiwagi, Hiroo, to Toyota Jidosha Kabushiki Kaisha. Coil spring compressor for use in the assembly of automotive suspension systems. 4,486,935, Cl. 29-227.000.
Kassel, David L.: *See*—
Engelstein, Charles; Kassel, David L.; and Goodman, Harry, 4,487,820, Cl. 429-100.000.
Katagiri, Kazuharu; Watanabe, Katsunori; Sakai, Kiyoshi; Ishikawa, Shozo; and Kitahara, Makoto, to Canon Kabushiki Kaisha. Electrophotographic photosensitive member containing a halogen substituted hydrazone. 4,487,824, Cl. 430-58.000.
Kataoka, Mitsuru: *See*—
Morisawa, Yasuhiro; Konishi, Kiyoshi; and Kataoka, Mitsuru, 4,487,781, Cl. 424-301.000.
Kato, Shinji; Uku, Kyouji; and Morikawa, Hisashi, to Kanegafuchi Chemical Industry Co., Ltd. Process of continuous suspension polymerization. 4,487,898, Cl. 526-65.000.
Kato, Yoshinori; Umemoto, Naoji; Takeda, Yumiko; and Hara, Takeshi, to Teijin Limited. Cytocidal modified immunoglobulin and process for the preparation thereof. 4,487,714, Cl. 260-112.00B.
Katsuma, Makoto; Alyfuku, Kiyoshi; Kawamura, Masaharu; Kiuchi, Masayoshi; and Murakami, Hiroyasu, to Canon Kabushiki Kaisha. Resonant sounder device for producing multiple warning sounds. 4,488,145, Cl. 340-384.00E.
Katz, Ira: *See*—
Yoshida, Takao; Katz, Ira; Warren, Craig B.; and Wiener, Charles, 4,487,613, Cl. 48-197.0FM.
Kaufman, Edward R., to P. T. Brake Lining Company. Friction lining material. 4,487,729, Cl. 264-26.000.
Kaufman, Lance R. Lead frame connector for compact circuit package. 4,488,202, Cl. 361-386.000.
Kaufman, Murlan: *See*—
Haines, Doug; Taylor, Keith; and Kaufman, Murlan, 4,488,093, Cl. 315-375.000.
Kaufmann, Rainer. Printing needle apparatus. 4,487,516, Cl. 400-124.000.
Kawabata, Kohji: *See*—
Takaya, Takao; Takasugi, Hisashi; Masugi, Takashi; Yamanaka, Hideaki; and Kawabata, Kohji, 4,487,927, Cl. 544-22.000.
Kawachi, Shoji: *See*—
Ueta, Yutaka; Kawachi, Shoji; and Hosokawa, Kazutaka, 4,487,882, Cl. 524-505.000.
Kawaguchi, Yoshiyuki, to Honda Giken Kogyo Kabushiki Kaisha. Carburetor device for V-type internal combustion engines. 4,487,170, Cl. 123-59.0PC.
Kawaguchiko Seimitsu Company Limited: *See*—
Koga, Ryoji, 4,487,819, Cl. 429-82.000.
Kawakami, Takahiro: *See*—
Shono, Masaru; Kawakami, Takahiro; Matsumoto, Toshiyuki; Tamura, Thoru; and Matsumoto, Hideki, 4,487,524, Cl. 405-50.000.
Kawamura, Masaharu: *See*—
Katsuma, Makoto; Alyfuku, Kiyoshi; Kawamura, Masaharu; Kiuchi, Masayoshi; and Murakami, Hiroyasu, 4,488,145, Cl. 340-384.00E.
Kawanami, Takao: *See*—
Kajiwara, Tetsuo; Hashimoto, Kazuyoshi; Kawanami, Takao; and Mori, Koichi, 4,487,050, Cl. 72-243.000.
Kawasaki, Hironobu; Sato, Takashi; Hayashi, Tomohiko; and Ozawa, Tsutomu, to Nippon Steel Corporation. Magnetic amorphous alloy sheet having a film thereon. 4,487,812, Cl. 428-629.000.
Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Watanabe, Jun-ichi; and Aoyama, Takahiko, 4,487,288, Cl. 181-238.000.
Kay, Robert E., to Ford Aerospace & Communications Corporation. Composition control of CSVPE HgCdTe. 4,487,813, Cl. 428-620.000.
Kaya, Tadahiro: *See*—
Sakuta, Masaharu; Kiya, Soichi; Uchizaki, Iwao; Yoshioka, Yasuhiko; Ito, Koichi; Saito, Toshio; Kaya, Tadahiro; Shioya, Tsunetoshi; and Shimoyama, Yoshifumi, 4,487,633, Cl. 106-90.000.
Kaynon, Walter, to Eastman Kodak Company. Fuser apparatus. 4,487,158, Cl. 118-60.000.
Kazarinov, Rudolf F.; and Luryi, Sergey, to AT&T Bell Laboratories. Quantized Hall effect switching devices. 4,488,164, Cl. 357-27.000.
Kearney & Trecker Corporation: *See*—
Johnstone, Richard, 4,487,087, Cl. 74-424.80A.
Keating, Walter W.: *See*—
Hladovcak, Raymond C.; and Keating, Walter W., 4,487,828, Cl. 430-313.000.
Kehren, Jean-Paul: *See*—
Boileau, Jacques; Emeury, Jean-Marie L.; and Kehren, Jean-Paul, 4,487,938, Cl. 548-304.000.
Kejr, Melvin P. Combine harvester apparatus. 4,487,004, Cl. 56-14.400.
Keller, James P.: *See*—
McMahon, Terrence S.; and Keller, James P., 4,487,153, Cl. 114-312.000.
Keller & Knappich Wehrtechnik GmbH, Firma: *See*—
Schiele, August; and Janda, Helmut, 4,487,104, Cl. 89-34.000.
Kelly, John M., to Stanley Works, The. Publication convertible to poster and removable insert and method of making same. 4,487,431, Cl. 283-1.00R.
Kelly, Joseph D.: *See*—
Duffer, Paul F.; Kelly, Joseph D.; and Franz, Helmut, 4,487,807, Cl. 428-422.000.
Kelly, Thomas P., to Cameron Iron Works, Inc. Subsea wellhead assembly. 4,487,527, Cl. 405-211.000.
Kendall Company, The: *See*—
Takemoto, George S.; and Boudreau, Joseph A., 4,487,872, Cl. 524-127.000.
Kenney, George C., II: *See*—
McFarlane, Robert; and Kenney, George C., II, 4,488,277, Cl. 369-48.000.
Kent, Raymond C.: *See*—
Haines, Charles, Jr.; and Kent, Raymond C., 4,487,793, Cl. 428-136.000.
Keough, William A.: *See*—
Lincoln, Joseph A.; and Keough, William A., 4,487,398, Cl. 266-120.000.
Kernforschungsanlage Julich GmbH: *See*—
Gupta, Ashok K.; Gyarmati, Ernoe; Kreutz, Hermann; Muenzer, Rudolf; and Naoumidis, Aristides, 4,487,644, Cl. 156-89.000.
Kersten, William W., to Lakeside Equipment Corporation. Sidewall mounted separator for removing solids in waste water. 4,487,692, Cl. 210-194.000.
Keshlear, William M.: *See*—
Zolnowsky, John E.; Keshlear, William M.; and Crisp, Richard D., 4,488,256, Cl. 364-900.000.
Kessler, Lawrence: *See*—
Fantozzi, Louis R.; Kessler, Lawrence; and Draxler, Richard, 4,487,502, Cl. 356-125.000.
KHD-Canada, Inc.: *See*—
Slezak, Paul J.; Durand, Marcel J. P. E.; and Dunlop, Robert P., 4,487,169, Cl. 123-41.330.
Kicinski, Kenneth J.; Printiss, Frederick H., Sr.; and Jasensky, Richard J., to Nelson Industries, Inc. Exhaust muffler with protective shield. 4,487,289, Cl. 181-252.000.
Kidde, Inc.: *See*—
Gillis, Joseph P.; and Andrew, William G., 4,487,266, Cl. 169-51.000.
Kikuchi, Keizo: *See*—
Takakusagi, Tsunehiko; and Kikuchi, Keizo, 4,487,549, Cl. 415-30.000.
Killop, James T., to Anderson-Cook, Inc. Thin-wall spline forming. 4,487,047, Cl. 72-88.000.
Kimata, Hiroshi; and Morizumi, Masaaki, to Asahi Kogaku Kogyo Kabushiki Kaisha. Automatic focusing camera. 4,487,495, Cl. 354-403.000.
Kimber, Geoffrey M.: *See*—
Clarke, James W.; Kimber, Geoffrey M.; and Rantell, Terry D., 4,487,682, Cl. 208-8.0LE.
Kimberly-Clark Corporation: *See*—
Lloyd, William D.; and Evers, Richard W., 4,487,796, Cl. 428-154.000.
Kimenis, Agris A.: *See*—
Biseniex, Egils A.; Veveris, Maris M.; Dubur, Gunar Y.; Polis, Yanis J.; Uldrikis, Yan R.; Barmenkova, Natalia V.; and Kimenis, Agris A., 4,487,932, Cl. 546-285.000.
Kimura, Hiroshi; Hisajima, Masahiko; Morimoto, Kiyoshi; Shibata, Kiyoshi; Nagashima, Takashi; Yoshikawa, Yasuhiko; Watashi, Masahiro; Yamamoto, Kiyonori; Yamamoto, Toshihiko; and Yoshinaga, Shinsuke, to Mita Industrial Co., Ltd. Optical device in variable magnification electrostatic copying apparatus. 4,487,497, Cl. 355-8.000.
Kimura, Katsumi: *See*—
Suzuki, Masaaki; Izawa, Kenzi; and Kimura, Katsumi, 4,487,283, Cl. 180-219.000.

Kimura, Ryoji: *See*—
Nakahara, Yutaka; and Kimura, Ryoji, 4,487,887, Cl. 525-123.000.
Nakahara, Yutaka; and Kimura, Ryoji, 4,487,900, Cl. 525-123.000.
Kinard, Michael D.: *See*—
Bohannon, William D., Jr.; and Kinard, Michael D., 4,487,641, Cl. 156-54.000.
King, William. Reeling device. 4,487,380, Cl. 242-107.300.
Kinjo, Hisao, to Victor Company of Japan, Limited. Copy-proof recording medium and device for adding copy-proof interference signal. 4,488,183, Cl. 358-319.000.
Kiozpeoplou, Diana K., to Colgate-Palmolive Company. Dispensing container of toothpaste which effervesces during toothbrushing. 4,487,757, Cl. 424-7.100.
Kirkpatrick, Thomas I.: *See*—
McTamaney, Louis S.; Delfino, Allan B.; Waltrip, Delbert F.; and Kirkpatrick, Thomas I., 4,487,061, Cl. 73-151.000.
Kirschenbaum, Bernard, to AT&T Bell Laboratories. Electrical socket connector construction. 4,487,464, Cl. 339-19.000.
Kirst, Herbert A.; and Toth, John E., to Eli Lilly and Company. Method of preparing 23-monoesters of OMT and DMT. 4,487,923, Cl. 536-7.100.
Kishida, Kazuo; and Mohri, Hiroshi, to Mitsubishi Rayon Co., Ltd. Process for producing impact resistant resins. 4,487,890, Cl. 525-193.000.
Kishizawa, Yuji: *See*—
Tomita, Takao; and Kishizawa, Yuji, 4,487,285, Cl. 180-228.000.
Kitahara, Makoto: *See*—
Katagiri, Kazuharu; Watanabe, Katsunori; Sakai, Kiyoshi; Ishikawa, Shozo; and Kitahara, Makoto, 4,487,824, Cl. 430-58.000.
Kitamoto, Tatsuji: *See*—
Umemura, Shizuo; and Kitamoto, Tatsuji, 4,487,627, Cl. 75-0.5BA.
Kitamura Gokin Industrial Co., Ltd.: *See*—
Kitamura, Yoshiaki; Nomura, Hitoshi; and Harada, Tuyoshi, 4,487,362, Cl. 236-12.200.
Kitamura, Yoshiaki; Nomura, Hitoshi; and Harada, Tuyoshi, to Kitamura Gokin Industrial Co., Ltd. Fixture for thermostatically mixing hot and cold water. 4,487,362, Cl. 236-12.200.
Kitaura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Aratani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; and Hashimoto, Masashi, to Fujisawa Pharmaceutical Co., Ltd. Peptide, process for preparation thereof and use thereof. 4,487,763, Cl. 424-177.000.
Kiuchi, Masayoshi: *See*—
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Kiya, Soichi: *See*—
Sakuta, Masaharu; Kiya, Soichi; Uchizaki, Iwao; Yoshioka, Yasuhiko; Ito, Koichi; Saito, Toshio; Kaya, Tadahiro; Shioya, Tsunetoshi; and Shimoyama, Yoshifumi, 4,487,633, Cl. 106-90.000.
Klein, Schanzlin & Becker AG: *See*—
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Klein, Siegfried; and Haas, Rainer J. Loudspeaker. 4,488,010, Cl. 179-110.00A.
Kleinebenne, Dieter; and Kleinebenne, Fred. Bicycle frame. 4,487,423, Cl. 280-279.000.
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Kleinebenne, Dieter; and Kleinebenne, Fred, 4,487,423, Cl. 280-279.000.
Klemarczyk, Philip T.: *See*—
Sprecker, Mark A.; Klemarczyk, Philip T.; and Belko, Robert P., 4,487,701, Cl. 252-8.600.
Klockner-Humboldt-Deutz AG: *See*—
Jager, Gernot; Spitz, Hubert; and Specht, Herbert, 4,487,575, Cl. 432-1.000.
Krczal, Robert, 4,487,175, Cl. 123-193.00H.
Okulicz, Conrad; and Nieden, Achim Z., 4,487,364, Cl. 237-12.30R.
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Gruber, Robert J.; and Knapp, John F., 4,487,825, Cl. 430-106.600.
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Knight, Keith S.: *See*—
Bogart, Frank J.; Dedisse, Mary R.; Divakaruni, Radhakrishna S.; Fette, Charles J.; Knight, Keith S.; Page, Karen L.; and Paxton, Thornton S., 4,488,004, Cl. 179-18.0AD.
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Fischer, Werner; Kniss, Helmut; and Locher, Johannes, 4,487,059, Cl. 73-116.000.
Knoebel, Howard: *See*—
Scheie, Carl E.; and Knoebel, Howard, 4,487,788, Cl. 427-9.000.
Knothe, Erich; Melcher, Franz-Josef; Oldendorf, Christian; and Ober, Jurgen, to Sartorius GmbH. High-resolution electronic balance. 4,487,280, Cl. 177-212.000.
Knudsen, Ronald D., to Phillips Petroleum Company. Ethylene dimerization. 4,487,847, Cl. 502-155.000.
Knudsen, Walter L.; and Burgio, Paul A., to Minnesota Mining and Manufacturing Company. Anchor for anchoring electrode leads used in cochlear implantation. 4,487,210, Cl. 128-785.000.
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Ishibai, Isao; and Kobayashi, Kunimitsu, 4,488,037, Cl. 250-204.000.
Kobayashi, Masashi. Coreless toilet paper roll and method for manufacture thereof. 4,487,378, Cl. 242-68.000.
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Kocks Technik GmbH & Co.: *See*—
Faste, Heinrich; and Bindernagel, Ali, 4,487,247, Cl. 164-126.000.
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Baier, Erich; Koefferlein, Rainer; and Schlageter, Bernhard, 4,487,496, Cl. 355-3.0DD.
Koerner, Gotz; Priesch, Manfred; Rau, Harald; and Schamberg, Eckehard, to Th. Goldschmidt AG. Process for the synthesis of a water-dilutable, heat-curable organopolysiloxane, modified with organic polyols. 4,487,809, Cl. 428-447.000.
Koga, Ryoji, to Kawaguchiko Seimitsu Company Limited. Flat battery. 4,487,819, Cl. 429-82.000.
Kohlmann, Friedrich-Wilhelm: *See*—
Himmele, Walter; Heberle, Wolfgang; Kohlmann, Friedrich-Wilhelm; and Wesenberg, Walter, 4,487,965, Cl. 564-454.000.
Koike, Masaru; Hasegawa, Yasumasa; Shimosaka, Satoru; Aoyama, Nagara; and Yoshizumi, Toshihiko, to Meinan Machinery Works, Inc. Method and apparatus for drying veneer sheet. 4,486,963, Cl. 34-116.000.
Koizumi, Yutaka: *See*—
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Kojima, Gen: *See*—
Yamabe, Masaaki; Kojima, Gen; and Akiyama, Katsuyuki, 4,487,893, Cl. 525-386.000.
Kojima, Tetsuhiko: *See*—
Sugimori, Shigeru; Kojima, Tetsuhiko; and Tsuji, Masakazu, 4,487,954, Cl. 560-107.000.
Kokusan Kinzoku Kogyo Kabushiki Kaisha: *See*—
Mochida, Haruo; Takeda, Yoshimitsu; Fukasawa, Takeshi; Masaki, Mikio; Shimizu, Kiichi; and Kobayashi, Satoru, 4,487,042, Cl. 70-186.000.
Komatsu, Toshio; and Kondoh, Yukio, to Mitsubishi Gas Chemical Co., Inc. Oxygen absorbent packaging. 4,487,791, Cl. 428-35.000.
Komatsu, Yasutoshi: *See*—
Otobe, Takashi; Komatsu, Yasutoshi; and Murakami, Yoshikazu, 4,488,109, Cl. 324-83.00R.
Komatsu Zenoah Co.: *See*—
Takayanagi, Yoshiaki; and Matsunaga, Takao, 4,487,402, Cl. 267-141.200.
Komoriya, Hitoshi: *See*—
Tabata, Fumio; Asakawa, Kazuo; and Komoriya, Hitoshi, 4,488,242, Cl. 364-513.000.
Komoto, Akira, to Shimadzu Corporation. Electronic balance. 4,487,279, Cl. 177-212.000.
Kondo, Hiroatsu: *See*—
Ozawa, Toshiaki; Yamada, Yasuaki; and Kondo, Hiroatsu, 4,487,517, Cl. 400-279.000.
Kondo, Ryoji; Higuchi, Kanji; Takamura, Kozo; Sato, Yasuyuki; and Nagai, Minoru, to Nippondenso Co., Ltd. Ignition plug. 4,488,081, Cl. 313-141.000.
Kondoh, Yukio: *See*—
Komatsu, Toshio; and Kondoh, Yukio, 4,487,791, Cl. 428-35.000.
Konig, Wolfgang; Geiger, Rolf; Obermeier, Rainer; and Mullner, Hubert, to Hoechst Aktiengesellschaft. New peptides and a process for their preparation. 4,487,764, Cl. 424-177.000.
Konishi, Kiyoshi: *See*—
Morisawa, Yasuhiro; Konishi, Kiyoshi; and Katsoka, Mitsuru, 4,487,781, Cl. 424-301.000.
Konishi, Yoshihiro: *See*—
Nomura, Shoichiro; and Konishi, Yoshihiro, 4,487,842, Cl. 501-135.000.
Konishiroku Photo Industry Co., Ltd.: *See*—
Tarumi, Noriyoshi; Iwahashi, Haruo; Matsunawa, Masahiko; and Tokunaga, Hiroshi, 4,488,160, Cl. 346-154.000.

Kono, Ichiro: *See—*
Nishie, Mitsuaki; Iguchi, Satoru; and Kono, Ichiro, 4,487,474, Cl. 350-96.210.

Koppers Company, Inc.: *See—*
Kuwana, Theodore, 4,487,669, Cl. 204-101.000.

Korpi, David M.: *See—*
Olin, John G.; and Korpi, David M., 4,487,062, Cl. 73-202.000.

Korshunov, Evgeny A.; Kuznetsov, Alexandr N.; Ovodenko, Maxim B.; Kuzmin, Gennady G.; Kostrov, Valery P.; Timofeev, Alexandr N.; Bastrikov, Valery L.; and Meschaninova, Tatyana V. Continuous casting process and apparatus. 4,487,250, Cl. 164-473.000.

Kosheleff, Patrick A. Rotary positive displacement motor. 4,487,176, Cl. 123-204.000.

Koslov, Joshua L.; and Wagner, Theodor M., to RCA Corporation. CCD Defect correction without defect location memory. 4,488,178, Cl. 358-163.000.

Kostrov, Valery P.: *See—*
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Kotecha, Harish N., to International Business Machines Corporation. Integrated dynamic RAM and ROS. 4,488,265, Cl. 365-189.000.

Kovacs, Gabor, to Ganz Villamossagi Muvek. Asynchronous machine with starting disc. 4,488,077, Cl. 310-212.000.

Kovalenko, Sergei S.: *See—*
Dukhhunian, Valery L.; Kovalenko, Sergei S.; Mashevich, Pavel R.; and Telenkov, Vyacheslav V., 4,488,264, Cl. 365-189.000.

Kowa Company, Ltd.: *See—*
Aoki, Nobuo; and Tamaki, Taro, 4,487,718, Cl. 260-112.50R.
Watanabe, Isamu; Kamiya, Kazuhiro; and Mori, Toshihito, 4,487,924, Cl. 536-16.100.

Kozawa, Nobuyoshi: *See—*
Mizutani, Ken-Ichiro; Masai, Hiroto; and Kozawa, Nobuyoshi, 4,487,551, Cl. 416-135.000.

Krabetz, Richard; Merger, Franz; and Schwarzmann, Matthias, to BASF Aktiengesellschaft. Preparation of methacrylic acid by gas phase oxidation of methacrolein. 4,487,962, Cl. 562-534.000.

Kraft, Wayne R.; Moore, Victor S.; Stahl, William L., Jr.; and Thoma, Nandor G., to International Business Machines Corporation. Tristate driver circuit with low standby power consumption. 4,488,067, Cl. 307-473.000.

Kraftwerk Union Aktiengesellschaft: *See—*
Weber, Jakob; Forster, Josef; and Weber, Robert, 4,487,165, Cl. 122-392.000.

Kraus, Mark G.: *See—*
Nasuta, Anthony T.; Boenning, Robert A.; and Kraus, Mark G., 4,488,301, Cl. 371-25.000.

Krczal, Robert, to Klockner-Humboldt-Deutz AG. Cylinder head for internal combustion engine. 4,487,175, Cl. 123-193.00H.

Kreutz, Hermann: *See—*
Gupta, Ashok K.; Gyarmati, Ernoe; Kreutz, Hermann; Muenzer, Rudolf; and Naoumidis, Aristides, 4,487,644, Cl. 156-89.000.

Krief, Alain, to Roussel Uclaf. Process for preparing cis or trans, optically active monoalkyl esters of cyclopropane-1,3-dicarboxylic acids. 4,487,955, Cl. 560-124.000.

Krieger, Friedrich; and Weis, Otto, to Gg. Noell GmbH. Device having expandable mandrel for making nuclear fuel element storage tubes. 4,487,356, Cl. 228-46.000.

Krise, John W., Jr.: *See—*
Jan Al, Rene ; and Krise, John W., Jr., 4,487,674, Cl. 204-181.00R.

Krisher, Dale L.; and Chitsaz, Sirus, to International Telephone and Telegraph Corporation. Processing register apparatus for use in digital signal processing systems. 4,488,255, Cl. 364-900.000.

Kroninger, Peter: *See—*
Nerlich, Ernst-Gunter; Bemmerl, Hans-Ferdinand; and Kroninger, Peter, 4,487,531, Cl. 405-291.000.

Kroupa, Petr: *See—*
Bartuska, Miloslav; Kroupa, Petr; Szabo, Josef; and Zverina, Karel, 4,487,841, Cl. 501-105.000.

Kruger, H. Eckhard; Freienstein, Bernd; and Schafer, Thomas, to Robert Bosch GmbH. Television viewing center system. 4,488,179, Cl. 358-181.000.

Kruse, James W.; Krutz, Gary W.; and Huggins, Larry F., to Krutz, Gary W. Automatic ground speed controller. 4,487,002, Cl. 56-10.200.

Kruse, Walter M.; and Stephen, John F., to ICI Americas Inc. High yield process for preparing 3,3',5,5'-tetraalkyl-4,4'-biphenol. 4,487,977, Cl. 568-730.000.

Kruse, Walter M.; and Stephen, John F., to ICI Americas Inc. High yield process for preparing 4,4'-biphenol and tert-alkylated-alkylbenzenes. 4,487,978, Cl. 568-730.000.

Krutz, Gary W.: *See—*
Kruse, James W.; Krutz, Gary W.; and Huggins, Larry F., 4,487,002, Cl. 56-10.200.

Krystal, Joseph. Cap with ear band. 4,486,903, Cl. 2-197.000.

Kub, Francis J.: *See—*
Bluzer, Nathan; Turley, Alfred P.; Kub, Francis J.; and Borsuk, Gerald M., 4,488,163, Cl. 357-24.000.

Kubick, Matthew D., to Perfex Corporation. Floor brush construction. 4,486,913, Cl. 15-159.00R.

Kubo, Takashige: *See—*
Wada, Kenichi; and Kubo, Takashige, 4,488,221, Cl. 364-200.000.

Kubota, Ltd.: *See—*
Ito, Ryoichi; Murakami, Osamu; Nakamura, Masayuki; Higo, Kazuo; and Ueno, Kengi, 4,487,180, Cl. 123-333.000.

Kubota, Tatsushi, to Kabushiki Kaisha Tokai-Rika-Denki Seisakusho. Webbing retractor. 4,487,381, Cl. 242-107.000.

Kuchar, Norman R.: *See—*
Case, Allen W., Jr.; Kuchar, Norman R.; and Peroutky, Donald C., 4,488,032, Cl. 219-124.340.

Kuciera, Joachim, to Becton, Dickinson and Company. Combination switching and display electronic modular control unit. 4,488,148, Cl. 340-700.000.

Kudo, Hirokatsu, to Honda Giken Kogyo Kabushiki Kaisha. Roof-top carrier mounting apparatus for vehicle. 4,487,349, Cl. 224-322.000.

Kugimiya, Koichi; Akiyama, Shigenobu; and Fuse, Genshu, to Director-General of the Agency of Industrial Science & Technology. Method of fabricating a multi-layer type semiconductor device including crystal growth by spirally directing energy beam. 4,487,635, Cl. 148-1.500.

Kugimiya, Youichi: *See—*
Ishibashi, Tadao; and Kugimiya, Youichi, 4,487,871, Cl. 524-100.000.

Kuhl, David K.: *See—*
Rothfuss, Robert G.; and Kuhl, David K., 4,487,394, Cl. 254-28.000.

Kukes, Semyon, to Phillips Petroleum Company. Olefin disproportionation and catalyst therefore. 4,487,986, Cl. 585-645.000.

Kulichenko, Valentin A.: *See—*
Antonov, Veniamin V.; Bat, Jury I.; Gamalei, Edvin I.; Dolzhenkov, Fedor E.; Donskoi, Semen A.; Kulichenko, Valentin A.; Tischenko, Oleg I.; Shtepa, Evgeny D.; and Chervonenko, Viktor M., 4,487,397, Cl. 266-44.000.

Kupcikevicius, Vytautas, to Union Carbide Corporation. Method and apparatus for attaching flexible membranes to a rigid backing. 4,486,939, Cl. 29-509.000.

Kuraoka, Yasuo: *See—*
Sakao, Nobuo; and Kuraoka, Yasuo, 4,487,033, Cl. 62-373.000.

Kurata, Hirotaka, to Trio Kabushiki Kasha. Videodisc playback system. 4,488,184, Cl. 358-342.000.

Kurihara, Takenori, to Takeda Riken Co., Ltd. Frequency synthesizer. 4,488,123, Cl. 331-2.000.

Kurland, Marvin: *See—*
Horey, Leonard I.; and Kurland, Marvin, 4,488,300, Cl. 371-21.000.

Kurmis, Viktor: *See—*
Brandt, Manfred; and Kurmis, Viktor, 4,487,694, Cl. 210-242.300.

Kuroda, Hiroshi; Nishimura, Tsukasa; Hashimoto, Taiki; Nishimura, Masakatsu; Kanda, Osamu; and Nozawa, Shigeru, to Babcock-Hitachi Kabushiki Kaisha. Limestone-gypsum flue gas desulfurization process. 4,487,784, Cl. 423-555.000.

Kurokawa, Koshiro: *See—*
Fujiwara, Mitsugu; Aso, Tomio; Kurokawa, Koshiro; and Obara, Hideo, 4,488,159, Cl. 346-139.00R.

Kutsenko, Sergei P.: *See—*
Danchenko, Valentin N.; Zayats, Alexandr A.; Potapov, Ivan N.; Finagin, Petr M.; and Kutsenko, Sergei P., 4,487,049, Cl. 72-208.000.

Kutzamanis, John S.: *See—*
DeBold, Terry A.; Frick, Douglas G.; and Kutzamanis, John S., 4,487,744, Cl. 420-584.000.

Kuwana, Theodore, to Koppers Company, Inc. Method for oxidation of an element in both compartments of an electrolytic cell. 4,487,669, Cl. 204-101.000.

Kuzmin, Gennady G.: *See—*
Korshunov, Evgeny A.; Kuznetsov, Alexandr N.; Ovodenko, Maxim B.; Kuzmin, Gennady G.; Kostrov, Valery P.; Timofeev, Alexandr N.; Bastrikov, Valery L.; and Meschaninova, Tatyana V., 4,487,250, Cl. 164-473.000.

Kuznetsov, Alexandr N.: *See—*
Korshunov, Evgeny A.; Kuznetsov, Alexandr N.; Ovodenko, Maxim B.; Kuzmin, Gennady G.; Kostrov, Valery P.; Timofeev, Alexandr N.; Bastrikov, Valery L.; and Meschaninova, Tatyana V., 4,487,250, Cl. 164-473.000.

Kytta, Oswald O., to Bendix Corporation, The. Brake actuator. 4,487,022, Cl. 60-547.100.

La-Man Corporation: *See—*
Mann, David O., 4,487,618, Cl. 55-323.000.

Labavia S.G.E.: *See—*
Marandet, Andre , 4,488,074, Cl. 310-93.000.

Lacoray S.A.: *See—*
Steiner, Walter, 4,487,284, Cl. 180-219.000.

LaForge, David H.; and Portner, Peer M., to Novacor Medical Corporation. Real time servo control apparatus and method. 4,488,099, Cl. 318-561.000.

Lahoda, Edward J.: *See—*
Pope, James M.; Harrison, Don E.; and Lahoda, Edward J., 4,487,711, Cl. 252-629.000.

Lake, Jack E., to Racine Federated Inc. Electric remote readout for fluid flow meter. 4,487,077, Cl. 73-861.580.

Lakeside Equipment Corporation: *See—*
Kersten, William W., 4,487,692, Cl. 210-194.000.

Lalancette, Jean M.; and Ostiguy, Claude, to Societe Nationale de L'Amiante. Fertilizers pelletized with hydrated sulfates. 4,487,624, Cl. 71-32.000.

Lam, Hon W.; and Yuan, Ham-Tzong, to Texas Instruments Incorporated. Localized epitaxy for VLSI devices. 4,487,639, Cl. 148-175.000.

Lam, William Y., to Edwin Cooper, Inc. Metal deactivator as a lubricant additive. 4,487,706, Cl. 252-47.000.

Lamb-Weston, Inc.: *See—*
Junge, Richard C., 4,487,786, Cl. 426-302.000.

Lambert, Hans R., to Astra Meditec Aktiebolag. Medical article having a hydrophilic coating. 4,487,808, Cl. 428-423.100.

Lambert, William J.: *See*—
Ippolito, Stephen J.; Singer, Arthur L.; and Lambert, William J., 4,488,224, Cl. 364-200.000.

Lamey, Robert E.: *See*—
Lehmann, Werner K.; Lamey, Robert E.; and Lehmann, Karl, 4,487,045, Cl. 72-43.000.

Lane, Charles H.; and Whittington, James K., to Essex Group, Inc. Simplified water-cooled welding cable terminal. 4,487,990, Cl. 174-15.0WF.

Lane, Robert J., to Lucas Industries Public Limited Company. Motor operated mechanism. 4,488,071, Cl. 310-68.00B.

Lang Apparatebau GmbH: *See*—
Saalmann, Gunter; and Haslberger, Richard, 4,486,910, Cl. 8-158.000.

Lang, Stephen P.; Martin, Yolanda E.; and Pinkston, Patrick E., to Deere & Company. Clutch temperature monitor. 4,488,140, Cl. 340-57.000.

Lange, Daniel J.; and Marquardt, Daniel J., to P. D. George Company, The. Stable polyamic acids. 4,487,911, Cl. 528-125.000.

Lange, Hans A., to Siemens Aktiengesellschaft. Device for wireless data transmission. 4,488,153, Cl. 343-6.5SS.

Lanier Business Products, Inc.: *See*—
Plunkett, Luther C., Jr., 4,488,274, Cl. 369-24.000.

Laporte Industries Limited: *See*—
Robinson, Michael; and Crosby, Alan D., 4,487,747, Cl. 423-60.000.

LaPrade, Steve A.: *See*—
Britt, James M.; LaPrade, Steve A.; and Martin, John T., 4,487,631, Cl. 106-80.000.

Larribe, Andre P., to Societe Nationale Industrielle Aerospatiale. Process for draping layers of composite materials. 4,487,730, Cl. 264-40.100.

Larson, Kenneth H.: *See*—
Tittes, Allan F.; Larson, Kenneth H.; Burton, Elmer E.; and Britton, Kennith L., 4,487,399, Cl. 266-158.000.

Larson, Wilfred. Trolling depth controller. 4,486,970, Cl. 43-43.130.

Larson, Wilfred. Boat stabilizer. 4,487,152, Cl. 114-274.000.

Larsson, Gunnar: *See*—
Olofsson, Olof; and Larsson, Gunnar, 4,487,110, Cl. 92-93.000.

Lauer, William: *See*—
McGaughey, John; McVay, W. Patrick; and Lauer, William, 4,487,605, Cl. 604-168.000.

Laurent, Daniel M.: *See*—
Salmon, Jean P.; and Laurent, Daniel M., 4,488,238, Cl. 364-483.000.

Lavery, John J., to International Paper Company. Dual compartment display carton. 4,487,311, Cl. 206-43.310.

Lawton, Geoffrey: *See*—
Hassall, Cedric H.; Lawton, Geoffrey; and Moody, Christopher J., 4,487,929, Cl. 544-224.000.

Leachman, Frank A., Jr.; and Noell, Godwin L., to Chandler Evans Inc. Centrifugal main fuel pump having starting element. 4,487,548, Cl. 415-28.000.

Leader Electronics Corp.: *See*—
Mino, Yoshikatu, 4,488,168, Cl. 358-10.000.

Leaseburge, Emory J.; and Perkins, Curtis L., to Combustion Engineering, Inc. Seal for liquid injection valve for gas chromatography. 4,487,080, Cl. 73-863.830.

Leatherman, Alfred F.: *See*—
Repik, Clyde P.; and Leatherman, Alfred F., 4,487,313, Cl. 206-205.000.

Lecorp, Inc.: *See*—
Watson, John A., 4,487,577, Cl. 432-37.000.

Lee, Bang W.: *See*—
Min, Sung K.; Lee, Bang W.; and Choi, Doo H., 4,488,094, Cl. 318-16.000.

Lee, Chung J., to Plastics Engineering Company. Polyimide-epoxy thermoset resins. 4,487,894, Cl. 525-423.000.

Lee, Fui-Tseng H., to FMC Corporation. Production of tertiary haloalkylphosphine oxides. 4,487,968, Cl. 568-14.000.

Lee, Hugh M., to Amiga Corporation. Control unit for video games and the like. 4,488,017, Cl. 200-5.00R.

Lee, Shi-Chuan, to Burroughs Corporation. EFL Latch merged with decoder-multiplexer. 4,488,063, Cl. 307-289.000.

Lehmann, Karl: *See*—
Lehmann, Werner K.; Lamey, Robert E.; and Lehmann, Karl, 4,487,045, Cl. 72-43.000.

Lehmann, Klaus: *See*—
Zappen, Hans-W.; Poetsch, Dieter; Lehmann, Klaus; Zimmermann, Friedrich; and Muller, Klaus D., 4,488,052, Cl. 250-578.000.

Lehmann, Peter; Mohr, Dieter; and Reiss, Kurt, to Hoechst Aktiengesellschaft. Light-sensitive copying material and process for the manufacture thereof utilizing non-ionic fluorinated ester surfactant. 4,487,823, Cl. 430-56.000.

Lehmann, Werner K.; Lamey, Robert E.; and Lehmann, Karl, to Sesco, Inc. Cradle straightener feeder. 4,487,045, Cl. 72-43.000.

Lehrer, William L., to Fairchild Camera & Instrument Corp. Multilayer metal silicide interconnections for integrated circuits. 4,488,166, Cl. 357-71.000.

Leibowitz, Martin N. Improvement in blade systems for shaving apparatus. 4,486,951, Cl. 30-45.000.

Leifeld, Ferdinand, to Trutzschler GmbH & Co. KG. Apparatus for producing a lap for a carding machine. 4,486,921, Cl. 19-105.000.

Leigh Instruments Limited: *See*—
Weaver, John H., 4,487,382, Cl. 242-197.000.

Lemaire, Charles A.; and Luick, David A., to International Business Machines Corporation. Extended control word decoding. 4,488,219, Cl. 364-200.000.

Lenhart, Richard: *See*—
Wolf, Hans; and Lenhart, Richard, 4,487,231, Cl. 138-118.100.

Lenz, Gary A.: *See*—
Burlage, Brian J.; Wiklund, David E.; and Lenz, Gary A., 4,487,076, Cl. 73-861.240.

Lepsevich, William J.: *See*—
Hatch, Marcus R.; and Lepsevich, William J., 4,487,473, Cl. 350-6.800.

Lerouge, Claude P. H., to ITT Industries, Inc. Parallel counter and application to binary adders. 4,488,253, Cl. 364-786.000.

Lester, Ralph: *See*—
Nesbitt, Brenda F.; Hall, David R.; Lester, Ralph; and Marrs, Gordon J., 4,487,759, Cl. 424-32.000.

Leukel, Bernd: *See*—
Neidig, Arno; Hettmann, Hubert; Leukel, Bernd; and Rief, Rolf, 4,488,167, Cl. 357-74.000.

Levine, Michael A. Extrinsic infrared detector with a charge reset function. 4,488,165, Cl. 357-30.000.

Levis, William W., Jr.: *See*—
Reichel, Curtis J.; Levis, William W., Jr.; and Pizzini, Louis C., 4,487,853, Cl. 521-172.000.

Leviton, Jan L.; and Meisch, Charles E., to Becton, Dickinson and Company. Suction canister with shut-off valve and smoke filter. 4,487,606, Cl. 604-319.000.

Levolor Lorentzen, Inc.: *See*—
Debs, Victor, 4,487,243, Cl. 160-168.000.

Lewis, Roy R., III; and Derrenbacker, James A., Jr., to Mangrove Systems, Inc. Submersible raft for the cultivation of plant life. 4,487,588, Cl. 441-43.000.

Li, Tao P., to Monsanto Company. Catalysts for the oxidation and ammoxidation of olefins. 4,487,850, Cl. 502-249.000.

Li, Yuan-Lu: *See*—
Bond, John A.; Li, Yuan-Lu; and Crane, Leslie J., 4,488,176, Cl. 358-141.000.

Lieb, Carl: *See*—
Haller, Kurt H.; Lieb, Carl; and Todoroff, Pete G., 4,487,166, Cl. 122-406.0ST.

Liechti, Niklaus; and Schneider, Rudolf, to Erowa AG. Electro-erosive processing apparatus. 4,488,029, Cl. 219-69.00C.

Liesch, Jerrold M.: *See*—
Cole, Lucille J.; Huang, Leeyan; and Liesch, Jerrold M., 4,487,761, Cl. 424-118.000.

Likozar, Joseph M.: *See*—
Compton, William H.; and Likozar, Joseph M., 4,487,079, Cl. 73-862.520.

Lilienthal, Alfred: *See*—
Dickhut, Heinrich; and Lilienthal, Alfred, 4,486,929, Cl. 29-33.00T.

Lin, Chiu-Hong, to Upjohn Company, The. 9-Substituted carbacyclin analogs. 4,487,960, Cl. 560-256.000.

Lincoln, Joseph A.; and Keough, William A., to Atmosphere Furnace Company. Salt bath quenching apparatus. 4,487,398, Cl. 266-120.000.

Lindemann, William T., to Extracorporeal Medical Specialties, Inc. Bubble detector circuit with variable reference level. 4,487,601, Cl. 604-122.000.

Lindfors, Sven G.; Antson, Jorma O.; Graeffe, Ralf; Pakkala, Arto J.; and Suntola, Tuomo S., to Oy Lohja Ab. Electroluminescence structure. 4,488,084, Cl. 313-506.000.

Lindner, Robert A., to Henkel Corporation. Polycarbonate processing. 4,487,874, Cl. 524-311.000.

Lindquist, Finn. Chimney turncap. 4,487,112, Cl. 98-71.000.

Lineberry, Patricia H. Fastening buckle for chains, strings of beads, pearls and like jewelry. 4,486,925, Cl. 24-518.000.

Lintrend Limited: *See*—
Sloan, Frederick R. W., 4,487,608, Cl. 8-493.000.

Lipsey, William S.; and Teague, Henry B. Hand-held calculator for performing calculations in feet, inches and fractions. 4,488,250, Cl. 364-709.000.

Liston, Thomas V.: *See*—
Yamaguchi, Elaine S.; and Liston, Thomas V., 4,487,704, Cl. 252-33.400.

Litjens, John J.: *See*—
Friedel, David G.; and Litjens, John J., 4,487,587, Cl. 440-51.000.

Litterer, Heinz; and Meidert, Helmut, to Hoechst Aktiengesellschaft. Process for the isolation of crystalline 1,3-cylohexanedione. 4,487,971, Cl. 568-366.000.

Livens, Michael G.; and Adams, James E., to Wilkinson Sword Limited. Method of, and apparatus for, manufacturing a flip-top box. 4,487,596, Cl. 493-125.000.

Livingston, Waylon A. Ultrasonic testing of tubular goods. 4,487,072, Cl. 73-622.000.

Lloyd, William D.; and Evers, Richard W., to Kimberly-Clark Corporation. Laminated, creped tissue and method of manufacture. 4,487,796, Cl. 428-154.000.

Lobeck, Walter G., Jr.: *See*—
Temple, Davis L., Jr.; and Lobeck, Walter G., Jr., 4,487,773, Cl. 424-250.000.

Locher, Johannes: *See*—
Fischer, Werner; Kniss, Helmut; and Locher, Johannes, 4,487,059, Cl. 73-116.000.

Lockheed Corporation: *See*—
Cronin, Michael J.; and Seid, Gordon, 4,487,034, Cl. 62-402.000.

Cronin, Michael J., 4,488,053, Cl. 290-4.00C.
Lockwood, James M.: *See—*
Cochcroft, Arthur F., Jr.; and Lockwood, James M., 4,488,222, Cl. 364-200.000.
LogE/Interpretation Systems Inc.: *See—*
Dalke, George W.; and Pugsley, Peter C., 4,488,245, Cl. 364-526.000.
Logic S.p.A.: *See—*
Pardi, Rodolfo; and Marchi, Giorgio, 4,487,066, Cl. 73-304.00C.
Logothetis, Eleftherios M.; and Vassell, William C., to Ford Motor Company. Planar ZrO_2 oxygen pumping sensor. 4,487,680, Cl. 204-426.000.
Logsdon, Duane D. Sump or flush installable roof drain. 4,487,690, Cl. 210-163.000.
Logsdon, Gary L.: *See—*
Bolton, Brent C.; Logsdon, Gary L.; Hagenmaier, Carl F., Jr.; and Wilson, Jesse R., 4,488,151, Cl. 340-825.500.
Lohmann Tierernahrung GmbH: *See—*
Mach, Walter J., 4,487,766, Cl. 424-180.000.
Lohr & Bromkamp GmbH: *See—*
Welschof Hans-Heinrich, 4,487,593, Cl. 464-111.000.
London Machinery Company Limited: *See—*
Van Wyngaarden, George, 4,487,507, Cl. 366-20.000.
Londontown Corporation: *See—*
Gonce, William P.; and Bilezikian, Edward S., 4,486,904, Cl. 2-312.000.
Long, Charles A., Jr. Sewage sludge treatment apparatus and process. 4,487,699, Cl. 210-760.000.
Longbrake, Howard R. Foldable holding device. 4,486,982, Cl. 51-68.000.
Lovgren, Eric M.; Golba, Joseph C., Jr.; and Reed, Randall A., to General Electric Company. Blending temperature sensitive components into a silicone modified thermoplastic. 4,487,858, Cl. 523-348.000.
Lowenthal, Hans, to Colibri Lighters Limited. Smokers lighter. 4,487,570, Cl. 431-130.000.
Lucarelli, Giancarlo. Watch for the space orientation in addition to the time orientation. 4,487,511, Cl. 368-15.000.
Lucas Industries Limited: *See—*
Harrison, Anthony W., 4,487,301, Cl. 192-4.00A.
Lucas Industries Public Limited Company: *See—*
Lane, Robert J., 4,488,071, Cl. 310-68.00B.
Moore, John H.; and Ives, Andrew P., 4,487,181, Cl. 123-357.000.
Luebbers, Willi, to Rheinmetall GmbH. Percussion fuse. 4,487,127, Cl. 102-253.000.
Lugosi, Gyorgy: *See—*
Szoke, Sandor; Lugosi, Gyorgy; Bakonyi, Maria; Ghyczy, Jeno ; and Csermely, Gyorgy, 4,487,936, Cl. 548-139.000.
Luick, David A.: *See—*
Lemaire, Charles A.; and Luick, David A., 4,488,219, Cl. 364-200.000.
Luk Lamellen und Kupplungsbau GmbH: *See—*
Maucher, Paul; and Geschka, Hugo-Werner, 4,487,173, Cl. 123-179.00J.
Lunn, Gerald K.: *See—*
Perkins, Geoffrey W.; and Lunn, Gerald K., 4,488,177, Cl. 358-158.000.
Luryi, Sergey: *See—*
Kazarinov, Rudolf F.; and Luryi, Sergey, 4,488,164, Cl. 357-27.000.
Luther, Hans W., to Rheinmetall GmbH. Cartridge ammunition. 4,487,131, Cl. 102-523.000.
Lutjens, Robert D.; and Duron, Paul P., to Cryomec, Inc. Cryogenic heat exchanger. 4,487,256, Cl. 165-76.000.
Lutz, Alfons: *See—*
Igel, Richard; Lutz, Alfons; Jardin, Hans; and Srdinko, Klaus-Peter, 4,487,449, Cl. 296-216.000.
Lutz, Michael A., to Raychem Corporation. Continuous sense and locate device. 4,487,057, Cl. 73-40.50R.
Luzader, Homer W.: *See—*
Dailey, George F.; and Luzader, Homer W., 4,488,079, Cl. 310-260.000.
M/A-Com Linkabit, Inc.: *See—*
Dunn, James E.; Bradbury, Colin; Holmes, Kenneth R.; and Treadwell, Stephen W., 4,488,290, Cl. 370-66.000.
M.A.N. Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft: *See—*
Neitz, Alfred; Pickel, Hans; and D'Alfonso, Nunzio, 4,487,178, Cl. 123-276.000.
M.A.N. Roland Druckmaschinen Aktiengesellschaft: *See—*
Kobler, Ingo; Stockel, Herbert; Mauer, Lutz; and Engl, Albert, 4,487,123, Cl. 101-216.000.
Kobler, Ingo; Stockl, Herbert; Meinke, Peter; Engl, Albert; and Hechler, Hatto, 4,487,124, Cl. 101-216.000.
M. Carder Industries, Inc.: *See—*
Carder, Mervin L., Sr., 4,487,238, Cl. 141-206.000.
Maak, Norbert: *See—*
Rose, David; and Maak, Norbert, 4,487,607, Cl. 8-408.000.
MacAllister, Burton W., Jr.: *See—*
Palilla, Frank C.; MacAllister, Burton W., Jr.; and McKenna, John F., 4,487,732, Cl. 264-61.000.
Palilla, Frank C.; MacAllister, Burton W., Jr.; and McKenna, John F., 4,487,733, Cl. 264-61.000.
MacGregor, Douglas B.: *See—*
Crudele, Lester M.; Zolnowsky, John E.; Moyer, William C.; and MacGregor, Douglas B., 4,488,228, Cl. 364-200.000.
Mach, Walter J., to Lohmann Tierernahrung GmbH. Growth stimulants and compositions containing same. 4,487,766, Cl. 424-180.000.
Machizawa, Kenzi: *See—*
Itoh, Masahiko; Midorikawa, Heihatiro; Minato, Akira; and Machizawa, Kenzi, 4,487,036, Cl. 62-474.000.
Machonis, John, Jr.: *See—*
Adur, Ashok M.; Schmukler, Seymour; Machonis, John, Jr.; and Shida, Mitsuzo, 4,487,885, Cl. 525-74.000.
Mackelburg, Gerald R.: *See—*
Held, Jimmy L.; Collins, Kenneth D.; and Mackelburg, Gerald R., 4,488,271, Cl. 367-151.000.
MacLaughlin, Donald N., to Cosden Technology, Inc. Electric motor rotation position control device. 4,488,097, Cl. 318-443.000.
Maclay, Robert E., to Steel Heddle Manufacturing Co. Reinforced loom shuttle and method. 4,487,234, Cl. 139-196.100.
MaCleod, Donald J., to Applied Motion Products, Inc. Tachometer assembly for magnetic motors. 4,488,076, Cl. 310-171.000.
Macriss, Robert A.; and Zawacki, Thomas S., to Institute of Gas Technology. Hyperabsorption space conditioning process and apparatus. 4,487,027, Cl. 62-112.000.
Magnavox Government and Industrial Electronics Company: *See—*
Tucker, Thomas L.; and Clark, Bill B., 4,486,928, Cl. 29-26.00A.
MagneTek Inc.: *See—*
Rettig, Charles E., 4,488,212, Cl. 363-54.000.
Magnetic Information Technology, Inc.: *See—*
Gyi, Ko Ko; and Grewal, Gurbachan S., 4,487,649, Cl. 156-293.000.
Magnetic Peripherals Inc.: *See—*
Berg, Thomas E.; and Pollard, Christopher A., 4,488,095, Cl. 318-38.000.
Magnum Shielding Corp.: *See—*
Hurwitz, Scott L., 4,487,995, Cl. 174-74.00R.
Maier-Hunke, Horst-Werner; Pfannkuch, Werner H. G.; and Vieler, Friedrich, to Hunke & Jochheim. Folder. 4,487,520, Cl. 402-65.000.
Majewski, Helmut W.: *See—*
Sherif, Fawzy G.; Majewski, Helmut W.; and Via, Francis A., 4,487,749, Cl. 423-309.000.
Makela, Paavo; Mannisto, Kalervo; and Masalin, Heikki, to Oy All-Plast Ab. Floor drain or some other cupped water seal. 4,487,219, Cl. 137-362.000.
Maker, Edward H., II: *See—*
De Vaughn, Donald H.; Watts, Philip S.; Raty, Dallas L.; and Maker, Edward H., II, 4,487,081, Cl. 73-864.130.
Maker, Edward H., III: *See—*
De Vaughn, Donald H.; Watts, Philip S.; Raty, Dallas L.; and Maker, Edward H., II, 4,487,081, Cl. 73-864.130.
Malek, Zdenek; Jelinek, Stanislav; Belling, Alexandr; Matena, Vladimir; and Jelinek, Jan, to Vyzkumny ustav silnoproude elektrotechniky. Heat exchanger for cryosurgical instruments. 4,487,253, Cl. 165-11.00R.
Malke, Wolfgang: *See—*
Rubey, Wolfgang; Baitz, Gunter; Malke, Wolfgang; and Noack, Harald, 4,487,519, Cl. 400-534.000.
Mallon, Charles B., to Union Carbide Corporation. Process for the preparation of alkyl silicates. 4,487,949, Cl. 556-470.000.
Malpass, Gerald D., Jr., to Hercules Incorporated. Polymerization of beta-pinene. 4,487,901, Cl. 526-185.000.
MAN Maschinenfabrik Augsburg-Nurnberg AG: *See—*
Stieber, Michael; and Dreher, Gunther, 4,488,234, Cl. 364-424.000.
Mangrove Systems, Inc.: *See—*
Lewis, Roy R., III; and Derrenbacker, James A., Jr., 4,487,588, Cl. 441-43.000.
Mann, David O., to La-Man Corporation. Airline vapor trap. 4,487,618, Cl. 55-323.000.
Mannesmann Aktiengesellschaft: *See—*
Buchheit, Otto K., 4,487,540, Cl. 414-30.000.
Manning, Edward T., Jr.: *See—*
Cornish, James E.; and Manning, Edward T., Jr., 4,487,547, Cl. 414-786.000.
Mannisto, Kalervo: *See—*
Makela, Paavo; Mannisto, Kalervo; and Masalin, Heikki, 4,487,219, Cl. 137-362.000.
Marandet, Andre , to Labavia S.G.E. Low power consumption electromagnetic retarder armature rotor. 4,488,074, Cl. 310-93.000.
Marchi, Giorgio: *See—*
Pardi, Rodolfo; and Marchi, Giorgio, 4,487,066, Cl. 73-304.00C.
Marconi Avionics Limited: *See—*
Fisher, Jeremy F.; Mundy, Anthony C.; and Perry, Michael J., 4,486,955, Cl. 33-262.000.
Mares, Otakar; and Ritter, Urs, to BBC Brown, Boveri & Company, Limited. Cardan-type pipe joint with compensation for longitudinal expansion. 4,487,436, Cl. 285-228.000.
Mareydt, Ray G., to Four Star Corporation. Adjustable and removable cross rail. 4,487,348, Cl. 224-321.000.
Marinak, Michael J.; and Simonson, John L., to Kalama Chemical, Inc. Production of mixtures rich in 6-chloro-2-trichloromethyl pyridine. 4,487,935, Cl. 546-345.000.
Mark, Victor; and Hedges, Charles V., to General Electric Company. Copolyester-carbonate compositions exhibiting improved processability. 4,487,896, Cl. 525-439.000.
Mark, Victor, to General Electric Company. Copolyester-carbonate resins exhibiting improved processability. 4,487,917, Cl. 528-196.000.
Markert, Helmut: *See—*
Bauer, Kurt; Hesch, Georg; Huber, Hans; Markert, Helmut; and Roth, Christian, 4,487,053, Cl. 72-335.000.

Markunas, Albert L.: *See*—
Burandt, Wesley A.; and Markunas, Albert L., 4,487,109, Cl. 91-506.000.
Markwardt, Klaus: *See*—
Hansel, Otto; and Markwardt, Klaus, 4,487,118, Cl. 99-348.000.
Marquardt, Daniel J.: *See*—
Lange, Daniel J.; and Marquardt, Daniel J., 4,487,911, Cl. 528-125.000.
Marrs, Gevan R., to Weyerhaeuser Company. Automatic particle-size analyzer. 4,487,323, Cl. 209-546.000.
Marrs, Gordon J.: *See*—
Nesbitt, Brenda F.; Hall, David R.; Lester, Ralph; and Marrs, Gordon J., 4,487,759, Cl. 424-32.000.
Mars, Incorporated: *See*—
Plesko, George A., 4,488,116, Cl. 324-236.000.
Marshall, Christopher B., to U.S. Philips Corporation. FM Demodulator. 4,488,119, Cl. 329-50.000.
Marshall, Leslie: *See*—
Tindall, Richard F.; Marshall, Leslie; and Hurlin, Stephen, 4,487,461, Cl. 312-323.000.
Marsocci, Angelo A., to American District Telegraph Company. Moving wall test device in optical smoke detectors. 4,488,049, Cl. 250-574.000.
Martel, Jacques; Tessier, Jean; and Demoute, Jean-Pierre, to Roussel Uclaf. Process for the preparation of alkyl 4-methyl-3-formyl-pentenl-oates. 4,487,957, Cl. 560-177.000.
Martin, George N., to International Business Machines Corporation. Fixed rate run length limited (RLL) code string generation using length oriented arithmetic code data string expansion and data string recovery using arithmetic code compression of RLL code strings. 4,488,143, Cl. 340-347.0DD.
Martin, John T.: *See*—
Britt, James M.; LaPrade, Steve A.; and Martin, John T., 4,487,631, Cl. 106-80.000.
Martin Marietta Corporation: *See*—
Baker, Edward B., 4,488,249, Cl. 364-571.000.
Martin, Yolanda E.: *See*—
Lang, Stephen P.; Martin, Yolanda E.; and Pinkston, Patrick E., 4,488,140, Cl. 340-57.000.
Martinez, Eloy J. Service rack for fuel injectors. 4,487,404, Cl. 269-15.000.
Martini, Helmut, to Robert Bosch GmbH. High-temperature, high-pressure article treatment apparatus, and method. 4,487,576, Cl. 432-25.000.
Martino, Phillip C., to SCM Corporation. Self-curing water dispersed polymers. 4,487,859, Cl. 523-406.000.
Martti, Lauri: *See*—
Karkkainen, Martti; and Martti, Lauri, 4,487,414, Cl. 273-371.000.
Maruya, Kazuo, to Nissan Motor Company, Limited. Thermosetting resin composition for injection molding and article formed by using the composition. 4,487,862, Cl. 523-506.000.
Maryland Cup Corporation: *See*—
Winstead, Thomas W., 4,487,329, Cl. 220-276.000.
Masai, Hiroto: *See*—
Mizutani, Ken-Ichiro; Masai, Hiroto; and Kozawa, Nobuyoshi, 4,487,551, Cl. 416-135.000.
Masaki, Mikio: *See*—
Mochida, Haruo; Takeda, Yoshimitsu; Fukasawa, Takeshi; Masaki, Mikio; Shimizu, Kiichi; and Kobayashi, Satoru, 4,487,042, Cl. 70-186.000.
Masalin, Heikki: *See*—
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Maschinenfabrik Alfred Schmermund GmbH & Co.: *See*—
Knecht, Siegfried, 4,487,351, Cl. 226-37.000.
Maschinenfabrik Sulzer-Ruti AG: *See*—
Steiner, Alois, 4,487,233, Cl. 139-28.000.
Mashevich, Pavel R.: *See*—
Dshkhunian, Valery L.; Kovalenko, Sergei S.; Mashevich, Pavel R.; and Telenkov, Vyacheslav V., 4,488,264, Cl. 365-189.000.
Maslanka, William W., to Hercules Incorporated. Aqueous solution of cationic thermosetting resin from N-bis(aminopropyl)methylamine/oxalic acid. 4,487,884, Cl. 524-845.000.
Massachusetts Institute of Technology: *See*—
Hynes, Richard O.; and Schwartz, Martin A., 4,487,838, Cl. 436-504.000.
Sharp, Phillip A.; Cepko, Constance L.; and Changelian, Paul, 4,487,829, Cl. 435-7.000.
Massie, Stephen N.; and Broyles, Allen R., to UOP Inc. Sulfur production. 4,487,753, Cl. 423-573.00R.
Masugi, Takashi: *See*—
Takaya, Takao; Masugi, Takashi; Takasugi, Hisashi; and Kochi, Hiromu, 4,487,767, Cl. 424-246.000.
Takaya, Takao; Masugi, Takashi; Takasugi, Hisashi; and Miyai, Kenzi, 4,487,768, Cl. 424-246.000.
Takaya, Takao; Takasugi, Hisashi; Masugi, Takashi; Yamanaka, Hideaki; and Kawabata, Kohji, 4,487,927, Cl. 544-22.000.
Matburn (Holdings) Limited: *See*—
Briggs, Peter J., 4,486,923, Cl. 24-30.50R.
Matena, Vladimir: *See*—
Malek, Zdenek; Jelinek, Stanislav; Belling, Alexandr; Matena, Vladimir; and Jelinek, Jan, 4,487,253, Cl. 165-11.00R.
Mathews, Bernard C.; and Matthews, Violet E., administrator. Multiple rotor mowers. 4,487,003, Cl. 56-13.600.
Mathews, Phillip A.: *See*—
Wagner, Martin D., Jr.; and Mathews, Phillip A., 4,488,226, Cl. 364-200.000.
Matsuda, Norio; Wada, Yasumitsu; and Chijiiwa, Masaru, to Pioneer Electronic Corporation. MFB Loudspeaker. 4,488,012, Cl. 179-115.50R.
Matsumoto, Hideaki: *See*—
Okada, Tokuhiro; Hayashi, Masayoshi; and Matsumoto, Hideaki, 4,488,248, Cl. 364-555.000.
Matsumoto, Hideki: *See*—
Shono, Masaru; Kawakami, Takahiro; Matsumoto, Toshiyuki; Tamura, Thoru; and Matsumoto, Hideki, 4,487,524, Cl. 405-50.000.
Matsumoto, Hiroshi: *See*—
Matsuoka, Naoki; Matsumoto, Hiroshi; Hori, Yutaka; Miki, Yoshio; Sano, Kenji; and Ijichi, Ichiro, 4,487,897, Cl. 526-64.000.
Matsumoto, Kenichi; Goto, Mashakatsu; Yomura, Kiyoshi; Otsuka, Masao; Hori, Koichi; and Okamura, Yoshiyuki, to Yaskawa Electric Mfg. Co., Ltd. Rotary-arc type gas-filled switch. 4,488,023, Cl. 200-147.00R.
Matsumoto, Masataka, to Citizen Watch Co., Ltd. Watch case structure. 4,487,513, Cl. 368-294.000.
Matsumoto, Toshiyuki: *See*—
Shono, Masaru; Kawakami, Takahiro; Matsumoto, Toshiyuki; Tamura, Thoru; and Matsumoto, Hideki, 4,487,524, Cl. 405-50.000.
Matsunaga, Takao: *See*—
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Matsunawa, Masahiko: *See*—
Tarumi, Noriyoshi; Iwahashi, Haruo; Matsunawa, Masahiko; and Tokunaga, Hiroshi, 4,488,160, Cl. 346-154.000.
Matsuoka, Naoki; Matsumoto, Hiroshi; Hori, Yutaka; Miki, Yoshio; Sano, Kenji; and Ijichi, Ichiro, to Nitto Electric Industrial Co., Ltd. Process for radical polymerizing acrylic monomers. 4,487,897, Cl. 526-64.000.
Matsushita Electric Industrial Co., Ltd.: *See*—
Muranaka, Takayoshi; and Mori, Hajime, 4,488,203, Cl. 361-433.000.
Ogawa, Kazufumi, 4,487,475, Cl. 350-96.210.
Shimizu, Hirokazu; Itoh, Kunio; Wada, Masaru; Sugino, Takashi; and Okabe, Takako, 4,488,304, Cl. 372-36.000.
Sugino, Takashi; Itoh, Kunio; Wada, Masaru; Shimizu, Hirokazu; Mizuno, Hiroyuki; and Fujimoto, Kazuo, 4,488,306, Cl. 372-46.000.
Takeda, Takashi; Yamamoto, Osamu; Murata, Kousaku; and Yamamoto, Kazumasa, 4,487,877, Cl. 524-413.000.
Tanaka, Shinichi; and Hirose, Namio, 4,488,276, Cl. 369-46.000.
Yanagiuchi, Yukihiro; Hirota, Eiichi; Sakakima, Hiroshi; and Senno, Harufumi, 4,488,195, Cl. 360-125.000.
Yoshimura, Yoshikazu, 4,488,124, Cl. 331-107.0DP.
Matsuzaki, Kaoru, to Tokyo Shibaura Denki Kabushiki Kaisha. No-break power supply apparatus. 4,488,200, Cl. 361-104.000.
Matthews, Violet E., administrator: *See*—
Mathews, Bernard C.; and Matthews, Violet E., administrator, 4,487,003, Cl. 56-13.600.
Mattsson, Kjell: *See*—
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Matuki, Akira: *See*—
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Maucher, Paul; and Geschka, Hugo-Werner, to Luk Lamellen und Kupplungsbau GmbH. Apparatus for starting an internal combustion engine. 4,487,173, Cl. 123-179.00J.
Mauer, Lutz: *See*—
Kobler, Ingo; Stockel, Herbert; Mauer, Lutz; and Engl, Albert, 4,487,123, Cl. 101-216.000.
Maurice, Jean; and Vauthier, Bernard, to Renault Techniques Nouvelles Appliquees. Modular drier for drying grains. 4,486,960, Cl. 34-64.000.
Mausezahl, Dieter, to Ciba-Geigy Corporation. Cold water soluble anthraquinone dyestuff composition. 4,487,610, Cl. 8-524.000.
Mayer, Andreas: *See*—
Haase, Werner; and Mayer, Andreas, 4,487,552, Cl. 417-64.000.
Mayer, Andrew S.: *See*—
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Mayer, Ingo, to Karl Mayer Textilmaschinenfabrik GmbH. Weft magazine arrangement for warp knitting machines. 4,487,039, Cl. 66-84.00A.
Mayer, James M., to Monsanto Company. Substituted-butaneperoxoic acids and process for bleaching. 4,487,723, Cl. 260-502.00R.
Mazda Motor Corporation: *See*—
Watanabe, Kenichi, 4,487,287, Cl. 180-297.000.
Mazelsky, Bernard, to ARA, Inc. Crashworthy rear-facing passenger seat for fixed wing aircraft. 4,487,383, Cl. 244-122.00R.
McCall, John M., to Upjohn Company, The. Isochromans. 4,487,774, Cl. 424-256.000.
McClain, W. Martin. Electronic bistable three-dimensional array. 4,488,308, Cl. 372-57.000.
McClellan, David P.; Duble, Gerald R.; and Hofferberth, William H., to Siemens-Allis, Inc. Contact assembly including spring loaded cam follower overcenter means. 4,488,133, Cl. 335-16.000.
McConnell, Richard L.: *See*—
Trotter, Jimmy R.; Joyner, Frederick B.; and McConnell, Richard L., 4,487,919, Cl. 528-272.000.

McDonald, James A., to Union Carbide Corporation. Bag folding apparatus. 4,487,598, Cl. 493-450.000.
McFadden, William C., to Dynametric, Inc. Magnetic shear locking methods and apparatus. 4,487,439, Cl. 292-251.500.
McFarlane, Robert; and Kenney, George C., II, to North American Philips Corporation. Control system for an optical data recording apparatus. 4,488,277, Cl. 369-48.000.
McGaughey, John; McVay, W. Patrick; and Lauer, William, to Critikon, Inc. Flashback device for catheters. 4,487,605, Cl. 604-168.000.
McGeough, Joseph A., to National Research Development Corporation. Methods and apparatus for the electrical machining of a workpiece. 4,487,671, Cl. 204-129.100.
McInerney Spring & Wire Co.: *See*—
Sasak, Frank, 4,486,924, Cl. 24-277.000.
McKee, William J. Instantaneous three-dimensional camera. 4,487,490, Cl. 354-115.000.
McKenna, John F.: *See*—
Palilla, Frank C.; MacAllister, Burton W., Jr.; and McKenna, John F., 4,487,732, Cl. 264-61.000.
Palilla, Frank C.; MacAllister, Burton W., Jr.; and McKenna, John F., 4,487,733, Cl. 264-61.000.
McKneelan, Robert L. Means for anchoring sheet to waterbed. 4,486,909, Cl. 5-451.000.
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Syme, Duncan C.; Caldwell, Eldon L.; Ferguson, Robert W.; Andors, Derik K.; and McLaughlin, Charles B., Jr., 4,487,195, Cl. 126-77.000.
McLeary, Ross C.; and Beckwith, Peter J., to Commonwealth of Australia, The. Continuously excited laser. 4,488,310, Cl. 372-58.000.
McLeroy, R. Philip: *See*—
Jeffers, Edward A.; McLeroy, R. Philip; and Sacerio, Jose L., 4,488,118, Cl. 324-455.000.
McLuen, Carl T. Variable displacement pump/motor. 4,487,108, Cl. 91-504.000.
McMahon, Terrence S.; and Keller, James P., to Eastport International, Inc. Cage for undersea tethered vehicles. 4,487,153, Cl. 114-312.000.
McManus, Kevin: *See*—
Withnall, Malcolm D. N.; Pemberton, Martin J.; and McManus, Kevin, 4,488,035, Cl. 235-384.000.
McMichael, Charles W., Jr., to UOP Inc. Prepacked well screen and casing assembly. 4,487,259, Cl. 166-228.000.
McNaughton, Allen D.: *See*—
Christensen, Terrence B.; McNaughton, Allen D.; and Umbach, Steven R., 4,487,602, Cl. 604-137.000.
McTamaney, Louis S.; Delfino, Allan B.; Waltrip, Delbert F.; and Kirkpatrick, Thomas I., to FMC Corporation. Method and apparatus for detecting well pump-off. 4,487,061, Cl. 73-151.000.
McVay, W. Patrick: *See*—
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Mead Johnson & Company: *See*—
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Mechanical Technology Incorporated: *See*—
Dineen, John J., 4,487,020, Cl. 60-521.000.
Meckel, Benjamin B. Magnetically-assisted sputtering method for producing vertical recording media. 4,487,675, Cl. 204-192.00M.
Medical Designs, Inc.: *See*—
Feanny, Michael P.; and Cumins, David L., 4,487,200, Cl. 128-80.00C.
Medoan Industrie Biochimiche Riunite, S.p.A.: *See*—
Baglioni, Alessandro, 4,487,771, Cl. 424-244.000.
Meeko, Joseph J. Weight lifting grips. 4,487,412, Cl. 272-123.000.
Mehl, Donald N., to Creative Research and Manufacturing Inc. Biopsy needle. 4,487,209, Cl. 128-754.000.
Meidert, Helmut: *See*—
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Meier, Robert, to Geberit Manufacturing, Inc. Water-saving flush valve. 4,486,906, Cl. 4-378.000.
Meignin, Jacques; Mollaret, Daniel; and Prost, Roger, to Thomson-CSF. Small-sized cryostatic device for photodetectors. 4,487,037, Cl. 62-514.00R.
Meinan Machinery Works, Inc.: *See*—
Koike, Masaru; Hasegawa, Yasumasa; Shimosaka, Satoru; Aoyama, Nagara; and Yoshizumi, Toshihiko, 4,486,963, Cl. 34-116.000.
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Meissner, Paul J., to Meissner Manufacturing Company. Spacing insert for concentric filter elements. 4,487,227, Cl. 138-37.000.
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Melcher, Franz-Josef: *See*—
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Mennenga, Hermann, to Balzers Aktiengesellschaft. Method and apparatus for detecting gas leaks. 4,487,058, Cl. 73-40.700.
Merck & Co., Inc.: *See*—
Bock, Mark G.; and DiPardo, Robert M., 4,487,963, Cl. 562-567.000.
Cole, Lucille J.; Huang, Leeyan; and Liesch, Jerrold M., 4,487,761, Cl. 424-118.000.
Mercy, Brian R., to International Business Machines Corporation. On chip monitor. 4,488,259, Cl. 364-900.000.
Merger, Franz: *See*—
Krabetz, Richard; Merger, Franz; and Schwarzmann, Matthias, 4,487,962, Cl. 562-534.000.
Merrill, Kenneth O.: *See*—
Pierce, Mel P.; and Merrill, Kenneth O., 4,487,345, Cl. 224-155.000.
Mertl, Vaclau: *See*—
Furrer, Andreas; Mertl, Vaclau; Milavec, Johann; and Stemmler, Herbert, 4,488,121, Cl. 330-10.000.
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Rampel, Hans; Dinkel, Emil; and Schulz, Volkmar, 4,487,391, Cl. 248-429.000.
Metals Production Research, Inc.: *See*—
Murphy, Andrew H., 4,487,677, Cl. 204-247.000.
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Mezick, James A., to Ortho Pharmaceutical Corporation. Topical treatment of non-inflammatory acne. 4,487,782, Cl. 424-317.000.
Michaels, Edwin S.: *See*—
Sherif, Fawzy G.; and Michaels, Edwin S., 4,487,632, Cl. 106-85.000.
Michel, Helle, to Compagnie Internationale pour l'Informatique Cii-Honeywell Bull. Magnetoresistant transducer for reading very high-density data. 4,488,194, Cl. 360-113.000.
Michel, Werner: *See*—
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Midorikawa, Heihatiro: *See*—
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Midwest Instrument Co., Inc.: *See*—
Boron, Joseph J., 4,487,082, Cl. 73-864.550.
Mihara, Shin-ichi, to Olympus Optical Co., Ltd. Behind-stop Tesser type lens system. 4,487,484, Cl. 350-449.000.
Mikami, Yoshiharu: *See*—
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Miki, Yoshio: *See*—
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Miller, Bearge. Simplified method for manufacturing an airtight cell. 4,487,648, Cl. 156-227.000.
Miller, David M.: *See*—
Taylor, Larry D.; Miller, David M.; and Thakur, Pramod C., 4,487,615, Cl. 55-84.000.
Miller, Harry, to Sperry Corporation. Speed control system for aircraft. 4,488,235, Cl. 364-433.000.
Miller, Henry W., to Mobil Oil Corporation. Anti-rotation coupling. 4,487,433, Cl. 285-81.000.
Miller, Jack V., to Union-Reed Corporation. Low brightness lens for circular fluorescent lamps. 4,488,208, Cl. 362-339.000.
Miller, Jeffrey T.; and Nevitt, Thomas D., to Standard Oil Company (Indiana). Process for reacting aromatic compounds. 4,487,983, Cl. 585-454.000.
Miller, Lynn D. Trot line dispenser. 4,486,971, Cl. 43-57.300.
Miller, Richard F.; and Nicholson, Michael P., to Atlantic Richfield Company. Inhibiting polymerization of vinyl aromatic monomers. 4,487,981, Cl. 585-4.000.

Miller, Richard F.; and Nicholson, Michael P., to Atlantic Richfield Company. Inhibiting polymerization of vinyl aromatic monomers. 4,487,982, Cl. 585-4.000.
Milles, Peter, to S. Franzen Sohne (GmbH & Co.). Permutation lock. 4,487,043, Cl. 70-312.000.
Milliken Research Corporation: *See*—
Inman, Billy E., 4,487,140, Cl. 112-79.00R.
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Min, Sung K.; Lee, Bang W.; and Choi, Doo H., to Samsung Semiconductor & Telecommunications Company, Ltd. Linear integrated circuit for driving a d.c. motor with radio control. 4,488,094, Cl. 318-16.000.
Minai, Kiichi: *See*—
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Turnbull, Everett M.; and Charbonneau, Jack W., 4,487,801, Cl. 428-313.500.
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Minolta Camera Kabushiki Kaisha: *See*—
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Miracle Recreation Equipment Company: *See*—
Ahrens, Paul W., 4,487,411, Cl. 272-56.50R.
Miscioscio, Kathleen B.; and Smith, Paul T., to OMI International Corporation. Electroplating bath and process for white palladium. 4,487,665, Cl. 204-47.000.
Mishima, Toshio, to Kabushiki Kaisha Kawai Gakki Seisakusho; and Tokyo Shibaura Denki K.K. Rhythm generator. 4,487,098, Cl. 84-1.030.
Mishra, Amarendra; Speros, Dimitri M.; and Eastin, Roger M., to General Electric Company. Method of preparing electron emissive coatings for electric discharge devices. 4,487,589, Cl. 445-51.000.
Mita Industrial Co., Ltd.: *See*—
Kimura, Hiroshi; Hisajima, Masahiko; Morimoto, Kiyoshi; Shibata, Kiyoshi; Nagashima, Takashi; Yoshikawa, Yasuhiko; Watashi, Masahiro; Yamamoto, Kiyonori; Yamamoto, Toshihiko; and Yoshinaga, Shinsuke, 4,487,497, Cl. 355-8.000.
Mitchell, Clarence I., to General Motors Corporation. Disc brake caliper with integral parking brake. 4,487,295, Cl. 188-72.600.
Mitchell, Darrell D., to Dow Corning Corporation. Wettable silicone resin optical devices and curable compositions therefor. 4,487,905, Cl. 528-15.000.
Mitchell, Joan L.; and Pennebaker, William B., to International Business Machines Corporation. Method for eliminating motion induced flicker in a video image. 4,488,174, Cl. 358-136.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Adachi, Hiromi; and Iwaya, Shoichi, 4,488,087, Cl. 315-101.000.
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Mitsubishi Heavy Industries, Ltd.: *See*—
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Kajiwara, Tetsuo; Hashimoto, Kazuyoshi; Kawanami, Takao; and Mori, Koichi, 4,487,050, Cl. 72-243.000.
Mitsubishi Keikinzoku Kogyo Kabushiki Kaisha: *See*—
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Mitsubishi Rayon Co., Ltd.: *See*—
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Sugimori, Teruhiko; and Tajiri, Noriyuki, 4,487,857, Cl. 523-335.000.
Mitutoyo Mfg. Co., Ltd.: *See*—
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Miu, Ming T.; and Bradley, John J., to Honeywell Information Systems Inc. Program counter stacking method and apparatus for nested subroutines and interrupts. 4,488,227, Cl. 364-200.000.
Miwa, Shigeru: *See*—
Gomi, Shimpei; Arai, Tomio; Takeuchi, Tomomitsu; Miwa, Shigeru; Takatsuka, Toru; and Watari, Ryuzo, 4,487,686, Cl. 208-48.00R.
Mixan, Craig E., to Dow Chemical Company, The. Titanium catalyzed transesterification. 4,487,933, Cl. 546-302.000.
Miyai, Kenzi: *See*—
Takaya, Takao; Masugi, Takashi; Takasugi, Hisashi; and Miyai, Kenzi, 4,487,768, Cl. 424-246.000.
Miyairi, Shota. Harmonic and pulsation reducing circuit used in a multiplex polyphase rectifier circuit. 4,488,211, Cl. 363-45.000.
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Hirata, Yoshihiro; Miyake, Kuniaki; and Yakushiji, Hisao, 4,487,161, Cl. 118-723.000.
Miyake, Toshio; Sakai, Shuzo; and Shibuya, Takashi, to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo. Process for producing a high-purity maltose. 4,487,198, Cl. 127-46.300.
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Miyamoto, Isei; Utsumi, Shunji; and Chikaraishi, Takayo, to Nissan Motor Company, Limited; and Ohi Seisakusho Co., Ltd. Child proof door locking device. 4,487,441, Cl. 292-336.300.
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Miyashita, Norio, to Honda Giken Kogyo Kabushiki Kaisha. Vehicular seat height adjusting device. 4,487,390, Cl. 248-396.000.
Miyata, Hiroyasu; Watanabe, Keizo; and Yamaguchi, Akio, to Sanshin Electric Co., Ltd. Push-button type tuner. 4,487,084, Cl. 74-10.330.
Miyoshi, Takahito; Okutu, Toshimitu; Fujiyama, Masaaki; Tatsuta, Sumitaka; and Tsuji, Nobuo, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,487,802, Cl. 428-336.000.
Mizrah, Tiberiu; Schepers, Bernhard; and Schroder, Bernd, to Swiss Aluminium Ltd. Process for manufacturing crystalline alumina. 4,487,756, Cl. 423-625.000.
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Mizusawa, Akira: *See*—
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Mizutani, Ken-Ichiro; Masai, Hiroto; and Kozawa, Nobuyoshi, to Aisin Seiki Kabushiki Kaisha. Fan assembly for vehicles. 4,487,551, Cl. 416-135.000.
Mobay Chemical Corporation: *See*—
Rawlings, Herbert L.; and Reinert, Gerard E., 4,487,881, Cl. 524-504.000.
Mobil Oil Corporation: *See*—
Dessau, Ralph M., 4,487,688, Cl. 208-310.00Z.
Haag, Werner O.; and Whitehurst, Darrell D., 4,487,972, Cl. 568-444.000.
Herrington, F. John, 4,487,597, Cl. 493-221.000.
Miller, Henry W., 4,487,433, Cl. 285-81.000.
Provan, Alexander R., 4,487,388, Cl. 248-97.000.
Ruehle, William H., 4,488,270, Cl. 367-73.000.
Schmitt, Kirk D., 4,487,702, Cl. 252-8.55D.
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Mochida, Haruo; Takeda, Yoshimitsu; Fukasawa, Takeshi; Masaki, Mikio; Shimizu, Kiichi; and Kobayashi, Satoru, to Nissan Motor Company, Limited; and Kokusan Kinzoku Kogyo Kabushiki Kaisha. Steering lock assembly. 4,487,042, Cl. 70-186.000.
Mochida, Haruo, to Nissan Motor Company, Limited. Electronic door locking system for an automotive vehicle. 4,488,056, Cl. 307-10.0AT.
Mochizuki, Masafumi: *See*—
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Mock, William L. Hole angularity inspection device. 4,486,954, Cl. 33-174.00Q.
Mohn, Hans-Werner; and Rosenberg, Heinz-Jurgen, to Jagenberg Aktiengesellschaft. Labeling machine. 4,487,650, Cl. 156-567.000.
Mohr, Dieter: *See*—
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Mollier, Pierre: *See*—
Basire, Dominique; Bhattacharyya, Arup; Howard, James K.; and Mollier, Pierre, 4,488,262, Cl. 365-104.000.
Monroe, Lawrence S., to American Sterilizer Company. Accessory clamp for abductor bar. 4,487,523, Cl. 403-385.000.

Monsanto Company: *See*—
Coran, Aubert Y.; and Patel, Raman, 4,487,888, Cl. 525-132.000.
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Li, Tao P., 4,487,850, Cl. 502-249.000.
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Montagna, Angelo A.: *See*—
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Moore, John H.; and Ives, Andrew P., to Lucas Industries public limited company. Fuel supply system for an internal combustion engine. 4,487,181, Cl. 123-357.000.
Moore, Richard P. Vehicle ports or vehicle covering systems and apparatus. 4,487,212, Cl. 135-90.000.
Moore, Victor S.: *See*—
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Moretti, Giuliano: *See*—
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Mori, Hajime: *See*—
Muranaka, Takayoshi; and Mori, Hajime, 4,488,203, Cl. 361-433.000.
Mori, Hidetomo; Suzuki, Akira; Uchida, Riichi; and Sasaki, Shigeru, to Hitachi, Ltd. Oil-free rotary displacement compressor. 4,487,563, Cl. 418-201.000.
Mori, Hisamitsu, to Tokyo Shibaura Denki Kabushiki Kaisha. Motor. 4,487,514, Cl. 384-113.000.
Mori, Koichi: *See*—
Kajiwara, Tetsuo; Hashimoto, Kazuyoshi; Kawanami, Takao; and Mori, Koichi, 4,487,050, Cl. 72-243.000.
Mori, Toshihito: *See*—
Watanabe, Isamu; Kamiya, Kazuhiro; and Mori, Toshihito, 4,487,924, Cl. 536-16.100.
Morikawa, Hisashi: *See*—
Kato, Shinji; Uku, Kyouji; and Morikawa, Hisashi, 4,487,898, Cl. 526-65.000.
Morimoto, Kiyoshi: *See*—
Kimura, Hiroshi; Hisajima, Masahiko; Morimoto, Kiyoshi; Shibata, Kiyoshi; Nagashima, Takashi; Yoshikawa, Yasuhiko; Watashi, Masahiro; Yamamoto, Kiyonori; Yamamoto, Toshihiko; and Yoshinaga, Shinsuke, 4,487,497, Cl. 355-8.000.
Morimoto, Yoshiro; Yamamuro, Sigeaki; Hirano, Hiroyuki; and Tanaka, Yoshikazu, to Nissan Motor Company, Limited. Parking lock arrangement for continuously variable V-belt transmission. 4,487,302, Cl. 192-4.00A.
Morinaga, Shigeki; and Sugiura, Yasuyuki, to Hitachi, Ltd. Motor control method and control apparatus therefor. 4,488,103, Cl. 318-811.000.
Morioka, Yoshihiro: *See*—
Nakamura, Takashi; Morioka, Yoshihiro; and Sugimoto, Hiroyuki, 4,488,085, Cl. 315-3.000.
Morisawa, Yasuhiro; Konishi, Kiyoshi; and Kataoka, Mitsuru, to Sankyo Company Limited. Trihaloallyl derivatives having anti-fungal activities. 4,487,781, Cl. 424-301.000.
Morishita, Akira, to Mitsubishi Denki Kabushiki Kaisha. Starter with magnet type D.C. motor. 4,488,073, Cl. 310-83.000.
Morita, Souji; and Mikami, Yoshiharu, to Kabushiki Kaisha Ishida Koki Seisakusho. Container distributing and charging apparatus. 4,487,277, Cl. 177-25.000.
Morita, Takayuki: *See*—
Horiuchi, Mitsunori; Fukuda, Tatemi; Muramatsu, Shigeru; and Morita, Takayuki, 4,487,012, Cl. 57-261.000.
Moriwaki, Katsuhiro: *See*—
Takashima, Katsuhiko; Moriwaki, Katsuhiro; and Taniguchi, Koichi, 4,487,642, Cl. 156-77.000.
Morizumi, Masaaki: *See*—
Kimata, Hiroshi; and Morizumi, Masaaki, 4,487,495, Cl. 354-403.000.
Morrice, Anthony R. S. Method of and apparatus for shoring a trench. 4,487,530, Cl. 405-282.000.
Morris, Kevin S.: *See*—
Pagano, Dominick A.; and Morris, Kevin S., 4,487,071, Cl. 73-612.000.
Morris, Nathan. Steering package for vessels. 4,487,149, Cl. 114-144.00E.
Morrison, Terry; Howlett, James J.; and Zagranski, Raymond D., to United Technologies Corporation. Helicopter cruise fuel conserving engine control. 4,488,236, Cl. 364-442.000.
Morse, Harvey E., to United States of America, Energy. Drum tiedown apparatus. 4,487,537, Cl. 410-47.000.
Moser, Mark D.: *See*—
Robinson, Delmar W.; Johnson, Russell W.; and Moser, Mark D., 4,487,848, Cl. 502-223.000.
Moshier, Everett: *See*—
Fletcher, Charles J.; and Moshier, Everett, 4,487,024, Cl. 62-3.000.
Moss, Stanton K.: *See*—
Davis, Richard A.; Moss, Stanton K.; and Wang, Sang-Yen, 4,488,193, Cl. 360-98.000.
Motorola, Inc.: *See*—
Almgren, Carl W., 4,487,652, Cl. 156-643.000.
Crudele, Lester M.; Zolnowsky, John E.; Moyer, William C.; and MacGregor, Douglas B., 4,488,228, Cl. 364-200.000.
Peebles, Douglas D., 4,486,918, Cl. 16-121.000.
Perkins, Geoffrey W.; and Lunn, Gerald K., 4,488,177, Cl. 358-158.000.
Petrie, Adelore F., 4,487,183, Cl. 123-418.000.
Zolnowsky, John E.; Keshlear, William M.; and Crisp, Richard D., 4,488,256, Cl. 364-900.000.
Moyer, William C.: *See*—
Crudele, Lester M.; Zolnowsky, John E.; Moyer, William C.; and MacGregor, Douglas B., 4,488,228, Cl. 364-200.000.
Moynagh, Eugene E., Jr.: *See*—
Freshwater, Lane A.; and Moynagh, Eugene E., Jr., 4,487,471, Cl. 339-99.00R.
Muccitelli, John A., to Betz Laboratories, Inc. Hydroquinone oxygen scavenger for use in aqueous mediums. 4,487,708, Cl. 252-178.000.
Mudgett-Hunter, Meredith: *See*—
Donahoe, Patricia K.; Budzik, Gerald P.; and Mudgett-Hunter, Meredith, 4,487,833, Cl. 435-172.200.
Muench, Jerome T.: *See*—
Campbell, George W.; and Muench, Jerome T., 4,487,803, Cl. 428-403.000.
Muenzer, Rudolf: *See*—
Gupta, Ashok K.; Gyarmati, Ernoe; Kreutz, Hermann; Muenzer, Rudolf; and Naoumidis, Aristides, 4,487,644, Cl. 156-89.000.
Mukawa, Tojiro; and Igarashi, Hatsuhide, to Nippon Electric Co., Ltd. Drive circuit. 4,488,061, Cl. 307-264.000.
Muller, Albert C.: *See*—
Forsyth, Eric B.; and Muller, Albert C., 4,487,991, Cl. 174-25.00R.
Muller, Bernard: *See*—
Schulte-Elte, Karl-Heinrich; and Muller, Bernard, 4,487,944, Cl. 549-416.000.
Muller, Hanns P.: *See*—
Richter, Roland; Muller, Hanns P.; and Wagner, Kuno, 4,487,928, Cl. 544-193.000.
Muller, Klaus D.: *See*—
Zappen, Hans-W.; Poetsch, Dieter; Lehmann, Klaus; Zimmermann, Friedrich; and Muller, Klaus D., 4,488,052, Cl. 250-578.000.
Muller, Kurt: *See*—
Dreyfuss, Wilfried; Remp, Thomas E., Jr.; and Muller, Kurt, 4,487,229, Cl. 138-96.00T.
Muller, Rolf: *See*—
Cap, Hinrich; von der Heide, Johann; and Muller, Rolf, 4,488,096, Cl. 318-328.000.
Mullet, David L.; Rilling, Raymond J.; and Voth, Elmer D., to Excel Industries, Inc. Storage box for mower clippings. 4,487,007, Cl. 56-16.600.
Mullner, Hubert: *See*—
Konig, Wolfgang; Geiger, Rolf; Obermeier, Rainer; and Mullner, Hubert, 4,487,764, Cl. 424-177.000.
Mundy, Anthony C.: *See*—
Fisher, Jeremy F.; Mundy, Anthony C.; and Perry, Michael J., 4,486,955, Cl. 33-262.000.
Murakami, Hiroyasu: *See*—
Katsuma, Makoto; Alyfuku, Kiyoshi; Kawamura, Masaharu; Kiuchi, Masayoshi; and Murakami, Hiroyasu, 4,488,145, Cl. 340-384.00E.
Murakami, Osamu: *See*—
Ito, Ryoichi; Murakami, Osamu; Nakamura, Masayuki; Higo, Kazuo; and Ueno, Kengi, 4,487,180, Cl. 123-333.000.
Murakami, Shoichi: *See*—
Sugioka, Takami; Miyake, Yuzuru; Murakami, Shoichi; and Ibuki, Hideaki, 4,487,374, Cl. 242-18.00A.
Murakami, Yoshikazu: *See*—
Otobe, Takashi; Komatsu, Yasutoshi; and Murakami, Yoshikazu, 4,488,109, Cl. 324-83.00R.
Muramatsu, Shigeru: *See*—
Horiuchi, Mitsunori; Fukuda, Tatemi; Muramatsu, Shigeru; and Morita, Takayuki, 4,487,012, Cl. 57-261.000.
Muranaka, Takayoshi; and Mori, Hajime, to Matsushita Electric Industrial Co., Ltd. Electrochemical double-layer capacitor and film enclosure. 4,488,203, Cl. 361-433.000.
Murata, Kousaku: *See*—
Takeda, Takashi; Yamamoto, Osamu; Murata, Kousaku; and Yamamoto, Kazumasa, 4,487,877, Cl. 524-413.000.
Murata Manufacturing Co., Ltd.: *See*—
Wakino, Kikuo; Minai, Kiichi; and Seno, Hiroshi, 4,487,578, Cl. 432-137.000.
Murphy, Andrew H., to Metals Production Research, Inc. Electrolytic recovery system for obtaining titanium metal from its ore. 4,487,677, Cl. 204-247.000.
Murphy, Lawrence M., to United States of America, Energy. Focusing solar collector and method for manufacturing same. 4,487,196, Cl. 126-438.000.
Murray, Paul M.; and Free, John M., to United States of America, Navy. Method for positioning the ends of fibres in a fibre optic array. 4,487,646, Cl. 156-177.000.

Mustang Units Co.: *See*—
Flaherty, William J., 4,487,290, Cl. 181-256.000.
Muzeroll, Martin E.; Bonazoli, Robert; Waymouth, John F.; and Karlotaki, Robert J., to GTE Products Corporation. High intensity discharge lamp. 4,488,091, Cl. 315-268.000.
Myers, Clarence H., to Pittsburgh-Des Moines Corporation. Multi-purpose elevated water storage facility. 4,486,988, Cl. 52-192.000.
Nachbur, Hermann; and Guth, Christian, to Ciba-Geigy Corporation. Process for fireproofing organic fibre material using phosphonic acid salts. 4,487,800, Cl. 428-265.000.
Nagai, Haruhiko: *See*—
Tanaka, Masaaki; Sato, Yukio; Hishii, Masao; and Nagai, Haruhiko, 4,488,309, Cl. 372-87.000.
Nagai, Minoru: *See*—
Kondo, Ryoji; Higuchi, Kanji; Takamura, Kozo; Sato, Yasuyuki; and Nagai, Minoru, 4,488,081, Cl. 313-141.000.
Nagashima, Shigeo: *See*—
Inagami, Yasuhiro; Nagashima, Shigeo; Omoda, Koichiro; and Torii, Shunichi, 4,488,247, Cl. 364-765.000.
Nagashima, Takashi: *See*—
Kimura, Hiroshi; Hisajima, Masahiko; Morimoto, Kiyoshi; Shibata, Kiyoshi; Nagashima, Takashi; Yoshikawa, Yasuhiko; Watashi, Masahiro; Yamamoto, Kiyonori; Yamamoto, Toshihiko; and Yoshinaga, Shinsuke, 4,487,497, Cl. 355-8.000.
Nagata, Fumio. Jet pump. 4,487,553, Cl. 417-171.000.
Nagel, Rudolf: *See*—
Boning, Bernward; Bone, Rainer; Nagel, Rudolf; and Sellmaier, Franz, 4,487,184, Cl. 123-425.000.
Naka, Hiromitsu, to Kabushiki Kaisha Naka Gijutsu Kenkyusho. Stair nosing. 4,486,987, Cl. 52-179.000.
Nakagawa, Akira: *See*—
Iwase, Takatoshi; and Nakagawa, Akira, 4,486,933, Cl. 29-157.30A.
Nakagawa, Kazuyuki: *See*—
Tominaga, Michiaki; Yang, Yung-hsiung; Ogawa, Hidenori; and Nakagawa, Kazuyuki, 4,487,772, Cl. 424-250.000.
Nakagawa, Yasuhiko: *See*—
Inoue, Ryuzaburo; Tange, Shoji; and Nakagawa, Yasuhiko, 4,487,188, Cl. 123-491.000.
Nakaguchi, Osamu: *See*—
Kitsura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Aratani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; and Hashimoto, Masashi, 4,487,763, Cl. 424-177.000.
Nakahara, Yutaka; and Kimura, Ryoji, to Adeka Argus Chemical Co., Ltd. Diallyl amino-4-(2,2,6,6-tetramethyl piperidyl) carboxylic acid esters and amides as monomers and polymers and stabilized synthetic resin compositions. 4,487,887, Cl. 525-123.000.
Nakahara, Yutaka; and Kimura, Ryoji, to Adeka Argus Chemical Co., Ltd. Diallyl 4-(2,2,6,6-tetramethyl piperidyl) amines as monomers and polymers and stabilized synthetic resin compositions. 4,487,900, Cl. 525-123.000.
Nakajima, Nobuhiro; and Ibata, Jyoji, to Asahi Kasei Kogyo Kabushiki Kaisha. Ultra-high molecular weight polyethylene composition. 4,487,875, Cl. 524-385.000.
Nakajyo, Hironori: *See*—
Nokihara, Yutaka; and Nakajyo, Hironori, 4,488,273, Cl. 369-11.000.
Nakamura, Masayuki: *See*—
Ito, Ryoichi; Murakami, Osamu; Nakamura, Masayuki; Higo, Kazuo; and Ueno, Kengi, 4,487,180, Cl. 123-333.000.
Nakamura, Takashi; Morioka, Yoshihiro; and Sugimoto, Hiroyuki, to Sony Corporation. Image pick-up tube arrangement. 4,488,085, Cl. 315-3.000.
Nakano, Shigeki; Yamada, Yasuyoshi; and Hiraga, Ryozo, to Canon Kabushiki Kaisha. Apparatus for processing a signal for alignment. 4,487,505, Cl. 356-400.000.
Nalco Chemical Company: *See*—
Reven, Frederick V., 4,487,804, Cl. 428-408.000.
Nando, Kenji: *See*—
Fujii, Hiroshi; Ishibashi, Akira; and Nando, Kenji, 4,488,100, Cl. 318-798.000.
Nao, Manabu; Takayasu, Mitsuru; and Oikawa, Shyuetsu, to Fujitsu Limited. Bill-discriminating apparatus. 4,487,306, Cl. 194-4.00C.
Naoumidis, Aristides: *See*—
Gupta, Ashok K.; Gyarmati, Ernoe; Kreutz, Hermann; Muenzer, Rudolf; and Naoumidis, Aristides, 4,487,644, Cl. 156-89.000.
Naraine, Patrick M.: *See*—
Collins, Adrian V.; and Naraine, Patrick M., 4,488,132, Cl. 333-229.000.
Nasuta, Anthony T.; Boenning, Robert A.; and Kraus, Mark G., to Westinghouse Electric Corp. System for analyzing complex signals. 4,488,301, Cl. 371-25.000.
Natale, Joseph J., to Combustion Engineering, Inc. Duct arrangement to eliminate exit gas temperature imbalance on rotary heat exchangers. 4,487,252, Cl. 165-7.000.
National Distillers and Chemical Corporation: *See*—
Hall, Allen L.; and Fayter, Richard G., Jr., 4,487,946, Cl. 549-474.000.
National Manufacturing Co.: *See*—
Johnston, James R.; and Meiste, Cordell E., 4,486,917, Cl. 16-70.000.
National Research Development Corporation: *See*—
Barton, John M., 4,487,914, Cl. 528-92.000.
McGeough, Joseph A., 4,487,671, Cl. 204-129.100.
Nesbitt, Brenda F.; Hall, David R.; Lester, Ralph; and Marrs, Gordon J., 4,487,759, Cl. 424-32.000.
NCR Corporation: *See*—
Cheffer, Harold H., 4,488,058, Cl. 307-66.000.
Cochcroft, Arthur F., Jr.; and Lockwood, James M., 4,488,222, Cl. 364-200.000.
Cooley, John J.; and Oosterbaan, DuWayne D., 4,488,001, Cl. 178-22.090.
Doty, James H., II, 4,488,065, Cl. 307-350.000.
Ward, Stephen W., 4,488,254, Cl. 364-900.000.
NECCHI Societa per Azioni: *See*—
Bianchi, Nereo, 4,487,144, Cl. 112-260.000.
Needham, Donald G., to Phillips Petroleum Company. Filled arylene sulfide polymer compositions containing (a) glass fiber in combination with (b) a mineral filler. 4,487,879, Cl. 524-423.000.
Neidig, Arno; Hettmann, Hubert; Leukel, Bernd; and Rief, Rolf, to Brown, Boveri & Cie AG. Current converter assembly in a flat housing. 4,488,167, Cl. 357-74.000.
Neitz, Alfred; Pickel, Hans; and D'Alfonso, Nunzio, to M.A.N. Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft. Air-compressing, direct-injection internal combustion engine. 4,487,178, Cl. 123-276.000.
Nelson Industries, Inc.: *See*—
Kicinski, Kenneth J.; Printiss, Frederick H., Sr.; and Jasensky, Richard J., 4,487,289, Cl. 181-252.000.
Nemoto, Shiro: *See*—
Watanabe, Niro; Nemoto, Shiro; Yasujima, Hiroyuki; and Yoshida, Kaneki, 4,487,826, Cl. 430-176.000.
Neptune Products Inc.: *See*—
Swenson, Pa la S., 4,486,969, Cl. 43-17.000.
Nerlich, Ernst-Gunter; Bemmerl, Hans-Ferdinand; and Krosinger, Peter, to Bochumer Eisenhutte Heintzmann GmbH & Co. KG. Travelling bracket. 4,487,531, Cl. 405-291.000.
Nesbitt, Brenda F.; Hall, David R.; Lester, Ralph; and Marrs, Gordon J., to Imperial Chemical Industries Limited; and National Research Development Corporation. Tertiary amine stabilized micro-encapsulated compositions containing behavior modifying compounds. 4,487,759, Cl. 424-32.000.
Netravali, Arun N., to AT&T Bell Laboratories. DPCM Video signal processing technique with spatial subsampling. 4,488,175, Cl. 358-136.000.
Nettleton, Donald E., Jr.; Bush, James A.; Bradner, William T.; and Doyle, Terrence W., to Bristol-Myers Company. Rebeccamycin and process for its preparation. 4,487,925, Cl. 536-24.000.
Netzel, Philip C.; and Spencer, Edward M., to Electric Power Research Institute. Multiple wall structure for flexible cable using tubular and spiral corrugations. 4,487,660, Cl. 174-28.000.
Neumann, Harald: *See*—
Struve, Timm; and Neumann, Harald, 4,487,526, Cl. 405-196.000.
Neusy, Hubert, to Glaverbel. Method and apparatus for manufacturing rounded vitreous beads. 4,487,620, Cl. 65-21.300.
Neves, Billy W., to Eckel Manufacturing Company, Inc. Power tong methods and apparatus. 4,487,092, Cl. 81-57.180.
Nevitt, Thomas D.: *See*—
Miller, Jeffrey T.; and Nevitt, Thomas D., 4,487,983, Cl. 585-454.000.
New York Institute of Technology: *See*—
Glenn, William E., 4,488,000, Cl. 178-18.000.
Nicholson, Michael P.: *See*—
Miller, Richard F.; and Nicholson, Michael P., 4,487,981, Cl. 585-4.000.
Miller, Richard F.; and Nicholson, Michael P., 4,487,982, Cl. 585-4.000.
Nickoladze, Leo G. Wheel cover retaining apparatus. 4,487,455, Cl. 301-37.0AT.
Nicolet Instrument Corporation: *See*—
Huang, Yuchi, 4,487,332, Cl. 220-445.000.
Nicoloff, Demetre M.: *See*—
Possis, Zinon C.; and Nicoloff, Demetre M., 4,487,567, Cl. 425-403.000.
Nieden, Achim Z.: *See*—
Okulicz, Conrad; and Nieden, Achim Z., 4,487,364, Cl. 237-12.30R.
Niesen, Joseph W.: *See*—
Garmire, Elsa M.; Evans, Gary A.; and Niesen, Joseph W., 4,488,307, Cl. 372-50.000.
Nifco Inc.: *See*—
Kagitani, Kazuhiro; Yoshitsugu, Seikichi; and Mizusawa, Akira, 4,486,985, Cl. 52-127.700.
Mizusawa, Akira, 4,488,206, Cl. 362-226.000.
Niikura, Yasuhiro: *See*—
Hidaka, Yoshiaki; and Niikura, Yasuhiro, 4,487,029, Cl. 62-133.000.
Nike, Inc.: *See*—
Friton, Michael R., 4,486,965, Cl. 36-50.000.
Nillesen, Antonius H. H. J., to U.S. Philips Corporation. Synchronizing circuit for a television receiver. 4,488,170, Cl. 358-26.000.
Nippon Columbia Co., Ltd.: *See*—
Aoki, Naohisa; and Matuki, Akira, 4,488,284, Cl. 369-147.000.
Nippon Electric Co., Ltd.: *See*—
Chiba, Hiroshi; and Ogura, Shoichi, 4,486,948, Cl. 29-827.000.
Chiwaki, Yoshinori, 4,488,223, Cl. 364-200.000.
Mukawa, Tojiro; and Igarashi, Hatsuhide, 4,488,061, Cl. 307-264.000.
Shimonou, Shigeru, 4,488,098, Cl. 318-561.000.
Yamamoto, Kazuhiro; and Atobe, Masaaki, 4,488,296, Cl. 370-104.000.
Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See*—
Iwanami, Teruo; and Hasegawa, Kenji, 4,487,789, Cl. 427-407.100.

Nippon Hoso Kyokai: *See*—
Nomura, Shoichiro; and Konishi, Yoshihiro, 4,487,842, Cl. 501-135.000.
Nippon Kokan Kabushiki Kaisha: *See*—
Hara, Tomihiro; Kagechika, Hiroshi; Doi, Satoshi; and Yomura, Yoshinori, 4,487,663, Cl. 204-27.000.
Nippon Shinyaku Co., Ltd.: *See*—
Enomoto, Hiroshi; Nomura, Akira; Aoyagi, Yoshiaki; and Ueda, Fusao, 4,487,770, Cl. 424-249.000.
Nippon Soken, Inc.: *See*—
Inagaki, Mitsuo; Takeda, Kenji; and Ito, Seitoku, 4,487,562, Cl. 418-84.000.
Nippon Steel Corporation: *See*—
Kajiwara, Tetsuo; Hashimoto, Kazuyoshi; Kawanami, Takao; and Mori, Koichi, 4,487,050, Cl. 72-243.000.
Kawasaki, Hironobu; Sato, Takashi; Hayashi, Tomohiko; and Ozawa, Tsutomu, 4,487,812, Cl. 428-629.000.
Nippondenso Co., Ltd.: *See*—
Iwase, Takatoshi; and Nakagawa, Akira, 4,486,933, Cl. 29-157.30A.
Kondo, Ryoji; Higuchi, Kanji; Takamura, Kozo; Sato, Yasuyuki; and Nagai, Minoru, 4,488,081, Cl. 313-141.000.
Nishie, Mitsuaki; Iguchi, Satoru; and Kono, Ichiro, to Sumitomo Electric Industries, Ltd. Optical connector with ceramic plugs and sleeve. 4,487,474, Cl. 350-96.210.
Nishimura, Masakatsu: *See*—
Kuroda, Hiroshi; Nishimura, Tsukasa; Hashimoto, Taiki; Nishimura, Masakatsu; Kanda, Osamu; and Nozawa, Shigeru, 4,487,784, Cl. 423-555.000.
Nishimura, Osamu: *See*—
Fujino, Masahiko; and Nishimura, Osamu, 4,487,726, Cl. 260-543.00R.
Nishimura, Toshihiko, to Mitsubishi Denki Kabushiki Kaisha. Data communication system. 4,488,003, Cl. 179-2.00C.
Nishimura, Tsukasa: *See*—
Kuroda, Hiroshi; Nishimura, Tsukasa; Hashimoto, Taiki; Nishimura, Masakatsu; Kanda, Osamu; and Nozawa, Shigeru, 4,487,784, Cl. 423-555.000.
Nishizawa, Akitoshi, to Kabushikigaisha Nishizawa. Ski. 4,487,426, Cl. 280-609.000.
Nissan Motor Company, Limited: *See*—
Hidaka, Yoshiaki; and Niikura, Yasuhiro, 4,487,029, Cl. 62-133.000.
Hosaka, Akio, 4,488,257, Cl. 364-900.000.
Inoue, Ryuzaburo; Tange, Shoji; and Nakagawa, Yasuhiko, 4,487,188, Cl. 123-491.000.
Ishikawa, Yasuki, 4,487,177, Cl. 123-260.000.
Kagitani, Kazuhiro; Yoshitsugu, Seikichi; and Mizusawa, Akira, 4,486,985, Cl. 52-127.700.
Maruya, Kazuo, 4,487,862, Cl. 523-506.000.
Miyamoto, Isei; Utsumi, Shunji; and Chikaraishi, Takayo, 4,487,441, Cl. 292-336.300.
Mochida, Haruo; Takeda, Yoshimitsu; Fukasawa, Takeshi; Masaki, Mikio; Shimizu, Kiichi; and Kobayashi, Satoru, 4,487,042, Cl. 70-186.000.
Mochida, Haruo, 4,488,056, Cl. 307-10.0A.T.
Morimoto, Yoshiro; Yamamuro, Sigeaki; Hirano, Hiroyuki; and Tanaka, Yoshikazu, 4,487,302, Cl. 192-4.00A.
Tanizaki, Hiroyuki; Ogawa, Takayoshi; and Ozaki, Yoshimi, 4,487,452, Cl. 297-349.000.
Nistico', Nicola: *See*—
Ascarelli, Paolo; Boccalon, Gianfranco; Moretti, Giuliano; Nistico', Nicola; and Pelacani, Alberto, 4,487,810, Cl. 428-461.000.
Nitecki, Danute E.; and Bhatnagar, Pradip K., to University of California, The Regents of the. Method of conjugating oligopeptides. 4,487,715, Cl. 260-112.50R.
Nitto Electric Industrial Co., Ltd.: *See*—
Matsuoka, Naoki; Matsumoto, Hiroshi; Hori, Yutaka; Miki, Yoshio; Sano, Kenji; and Ijichi, Ichiro, 4,487,897, Cl. 526-64.000.
Nitz, Martin, to Gabler GmbH & Co. KG. Garbage truck with revolving receptacle. 4,487,543, Cl. 414-468.000.
Nixdorf Computer AG: *See*—
Burchart, Joachim, 4,488,146, Cl. 340-407.000.
Rubey, Wolfgang; Baitz, Gunter; Malke, Wolfgang; and Noack, Harald, 4,487,519, Cl. 400-534.000.
Noack, Harald: *See*—
Rubey, Wolfgang; Baitz, Gunter; Malke, Wolfgang; and Noack, Harald, 4,487,519, Cl. 400-534.000.
Noell, Godwin L.: *See*—
Leachman, Frank A., Jr.; and Noell, Godwin L., 4,487,548, Cl. 415-28.000.
Noetzel, Siegfried; Scholl, Margarete; and Ballreich, Heinz, to Benckiser-Knapsack GmbH. Process of and composition for de-inking waste paper as well as paper reclaimed by said process. 4,487,655, Cl. 162-5.000.
Noguchi, Masahiko: *See*—
Onojima, Yoshio; Yoneda, Kenichi; Kamimura, Yoshihiko; Shimada, Akira; and Noguchi, Masahiko, 4,487,748, Cl. 423-240.000.
Noguchi, Minori; Otsubo, Toru; Aiuchi, Susumu; Kamimura, Takashi; and Fujii, Teru, to Hitachi, Ltd. Dry-etching apparatus. 4,487,678, Cl. 204-298.000.
Nokihara, Yutaka; and Nakajyo, Hironori, to Tokyo Shibaura Denki Kabushiki Kaisha. Magnetic reproducing apparatus capable of receiving radio broadcast programs. 4,488,273, Cl. 369-11.000.
Nomel: *See*—
Hrouda, Georges, 4,487,204, Cl. 128-325.000.
Nomura, Akira: *See*—
Enomoto, Hiroshi; Nomura, Akira; Aoyagi, Yoshiaki; and Ueda, Fusao, 4,487,770, Cl. 424-249.000.
Nomura, Hitoshi: *See*—
Kitamura, Yoshiaki; Nomura, Hitoshi; and Harada, Tuyoshi, 4,487,362, Cl. 236-12.200.
Nomura, Shoichiro; and Konishi, Yoshihiro, to Nippon Hoso Kyokai. Low-loss microwave dielectric material. 4,487,842, Cl. 501-135.000.
Nonomura, Keisaku; Takamatsu, Toshiaki; Uede, Hisashi; and Wada, Tomio, to Sharp Kabushiki Kaisha. Multi-layer matrix type liquid crystal display panel. 4,487,480, Cl. 350-335.000.
Nordco Limited: *See*—
Fancey, Everett G.; Peters, John V.; and Tucker, Russell E., 4,486,967, Cl. 43-4.500.
Nordstrom, Kurt: *See*—
Uhlin, Bernt E.; Nordstrom, Kurt; Molin, Soeren; and Gustaffson, Petter, 4,487,835, Cl. 435-317.000.
North American Philips Corporation: *See*—
McFarlane, Robert; and Kenney, George C., II, 4,488,277, Cl. 369-48.000.
North American Utility Construction Corp.: *See*—
Stark, Virgil, 4,487,659, Cl. 202-172.000.
Northern Telecom Limited: *See*—
Bond, John A.; Li, Yuan-Lu; and Crane, Leslie J., 4,488,176, Cl. 358-141.000.
Carsten, Ralph T., 4,488,120, Cl. 329-122.000.
Suthers, Mark S., 4,488,126, Cl. 333-18.000.
Novacor Medical Corporation: *See*—
LaForge, David H.; and Portner, Peer M., 4,488,099, Cl. 318-561.000.
Novon, Inc.: *See*—
Hutchin, Richard A., 4,488,172, Cl. 358-107.000.
Nozawa, Shigeru: *See*—
Kuroda, Hiroshi; Nishimura, Tsukasa; Hashimoto, Taiki; Nishimura, Masakatsu; Kanda, Osamu; and Nozawa, Shigeru, 4,487,784, Cl. 423-555.000.
Nuclear Metals, Inc.: *See*—
Roberts, Peter R., 4,488,031, Cl. 219-69.00R.
Nuovo Pignone S.p.A.: *See*—
Vinciguerra, Costantino, 4,487,014, Cl. 60-39.310.
N.V. Optische Industria "De Oude Delft": *See*—
Versteeg, Frits J., 4,487,483, Cl. 350-444.000.
O'Bar, Edward J., to Jannel & Son Body Company. Track and latch assembly for slidable door. 4,486,980, Cl. 49-449.000.
Obara, Hideo: *See*—
Fujiwara, Mitsugu; Aso, Tomio; Kurokawa, Koshiro; and Obara, Hideo, 4,488,159, Cl. 346-139.00R.
Ober, Jurgen: *See*—
Knothe, Erich; Melcher, Franz-Josef; Oldendorf, Christian; and Ober, Jurgen, 4,487,280, Cl. 177-212.000.
Obermeier, Rainer: *See*—
Konig, Wolfgang; Geiger, Rolf; Obermeier, Rainer; and Mullner, Hubert, 4,487,764, Cl. 424-177.000.
O'Brien, Harold A., Jr.; Barnes, John W.; Taylor, Wayne A.; Thomas, Kenneth E.; and Bentley, Glenn E., to United States of America, Energy. Method of producing ^{67}Cu. 4,487,738, Cl. 376-192.000.
Occidental Research Corp.: *See*—
Dines, Martin B.; and DiGiacomo, Peter M., 4,487,922, Cl. 528-395.000.
Odermann, Charles R.: *See*—
Rodda, Donald; and Odermann, Charles R., 4,487,142, Cl. 112-168.000.
Odozynski, John A., to GTE Products Corporation. Bifurcated electroacoustic delay line with diagonal coupling. 4,488,128, Cl. 333-142.000.
Ogawa, Hidenori: *See*—
Tominaga, Michiaki; Yang, Yung-hsiung; Ogawa, Hidenori; and Nakagawa, Kazuyuki, 4,487,772, Cl. 424-250.000.
Ogawa, Kazufumi, to Matsushita Electric Industrial Co., Ltd. Light-guide and process for producing the same using a photo-setting adhesive. 4,487,475, Cl. 350-96.210.
Ogawa, Takayoshi: *See*—
Tanizaki, Hiroyuki; Ogawa, Takayoshi; and Ozaki, Yoshimi, 4,487,452, Cl. 297-349.000.
Ogura, Shoichi: *See*—
Chiba, Hiroshi; and Ogura, Shoichi, 4,486,948, Cl. 29-827.000.
Ohi Seisakusho Co., Ltd.: *See*—
Miyamoto, Isei; Utsumi, Shunji; and Chikaraishi, Takayo, 4,487,441, Cl. 292-336.300.
Ohinata, Okinobu; Hirahara, Takuho; Sakaino, Keiju; Uzawa, Yawara; Shimizu, Nobuhiro; and Shida, Shigeru, to Mitsubishi Denki Kabushiki Kaisha. Hermetic motor compressor. 4,487,555, Cl. 417-312.000.
Ohlenforst, Hans; and Gatzweiler, Werner. Glass pane for an automobile rear view window. 4,488,141, Cl. 340-97.000.
Ohmori, Toshio; and Yamamoto, Mineo, to Bridgestone Tire Co., Ltd.; and Japan Synthetic Rubber Co., Ltd. Rubber compositions for use in tires. 4,487,892, Cl. 525-237.000.
Ohzono, Kohei: *See*—
Wakatsuki, Goroei; Ohzono, Kohei; and Shibuya, Masanori, 4,487,282, Cl. 180-210.000.
Oikawa, Shyuetsu: *See*—
Nao, Manabu; Takayasu, Mitsuru; and Oikawa, Shyuetsu, 4,487,306, Cl. 194-4.00C.
Oishi, Kengo; and Suzuki, Osamu, to Fuji Photo Film Co., Ltd. Magnetic recording disk cartridge. 4,488,190, Cl. 360-97.000.
Oishi, Kengo; and Suzuki, Osamu, to Fuji Photo Film Co., Ltd. Magnetic recording disk cartridge. 4,488,191, Cl. 360-97.000.

Okabe, Takako: *See*—
Shimizu, Hirokazu; Itoh, Kunio; Wada, Masaru; Sugino, Takashi; and Okabe, Takako, 4,488,304, Cl. 372-36.000.
Okada, Satoshi: *See*—
Kitaura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Arstani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; and Hashimoto, Masashi, 4,487,763, Cl. 424-177.000.
Okada, Tokuhiro; Hayashi, Masayoshi; and Matsumoto, Hideaki, to Toa Medical Electronics Co., Ltd. Particle size distribution analyzer. 4,488,248, Cl. 364-555.000.
Okamura, Yoshiyuki: *See*—
Matsumoto, Kenichi; Goto, Mashakatsu; Yomura, Kiyoshi; Otsuka, Masao; Hori, Koichi; and Okamura, Yoshiyuki, 4,488,023, Cl. 200-147.00R.
Okulicz, Conrad; and Nieden, Achim Z., to Klockner-Humboldt-Deutz AG. Arrangement for heating the operator's cabin of a machine driven by an internal combustion engine. 4,487,364, Cl. 237-12.30R.
Okumura, Takeo: *See*—
Yamamoto, Hiromi; and Okumura, Takeo, 4,487,760, Cl. 424-70.000.
Okunuki, Masahiko: *See*—
Anazawa, Norimichi; Okunuki, Masahiko; and Aihara, Ryuzo, 4,488,045, Cl. 250-423.00R.
Okutu, Toshimitu: *See*—
Miyoshi, Takahito; Okutu, Toshimitu; Fujiyama, Masaaki; Tatsuta, Sumitaka; and Tsuji, Nobuo, 4,487,802, Cl. 428-336.000.
Oldendorf, Christian: *See*—
Knothe, Erich; Melcher, Franz-Josef; Oldendorf, Christian; and Ober, Jurgen, 4,487,280, Cl. 177-212.000.
Olesen, Russell, to Puritan-Bennett Corporation. Pneumatically powered oxygen pressure loss alarm system. 4,487,155, Cl. 116-70.000.
Olin Corporation: *See*—
Boudakian, Max M., 4,487,969, Cl. 568-316.000.
Foster, Craig A.; and Shaffer, John H., 4,487,751, Cl. 423-474.000.
Olin, John G.; and Korpi, David M., to Sierra Instruments, Inc. Mass flowmeter. 4,487,062, Cl. 73-202.000.
Oliver, Larry R.: *See*—
Quick, Terrence R.; and Oliver, Larry R., 4,487,595, Cl. 474-15.000.
Ollis, Martin G.; and Hart, John E. Darts. 4,487,420, Cl. 273-423.000.
Olofsson, Olof; and Larsson, Gunnar, to E.M.E. System Aktiebolag. Clamping element. 4,487,110, Cl. 92-93.000.
Olson, Carl G. Roller apparatus for a flexible web. 4,487,244, Cl. 160-283.000.
Olson, George E., to A. O. Smith Harvestore Products, Inc. Sprocket construction for a zero caternary chain. 4,487,088, Cl. 74-462.000.
Olympus Optical Co., Ltd.: *See*—
Hayasaka, Toshimi, 4,487,486, Cl. 350-525.000.
Mihara, Shin-ichi, 4,487,484, Cl. 350-449.000.
Saitou, Sinichi, 4,488,197, Cl. 360-137.000.
Takamatsu, Takeshi, 4,487,489, Cl. 354-62.000.
Takayanagi, Akitoshi; and Kano, Tokio, 4,487,836, Cl. 436-2.000.
Takenaga, Hideo; Ichikawa, Hiroki; and Orita, Shunichi, 4,488,196, Cl. 360-137.000.
Terui, Nobuo, 4,488,186, Cl. 360-71.000.
Omacini, Alberto: *See*—
Semeghini, Gian L.; Ferrari, Roberto; Rizzotto, Vittorino; Omacini, Alberto; and Rossi, Carlo, 4,487,647, Cl. 156-181.000.
Omae, Michinobu: *See*—
Oshima, Yasushi; and Omae, Michinobu, 4,487,338, Cl. 222-196.000.
OMI International Corporation: *See*—
Dao, Hoa T., 4,487,159, Cl. 118-418.000.
Miscioscio, Kathleen B.; and Smith, Paul T., 4,487,665, Cl. 204-47.000.
Omicron Technology Corporation: *See*—
Gates, William E.; and Pieters, Wim J. M., 4,487,213, Cl. 137-2.000.
Omoda, Koichiro: *See*—
Inagami, Yasuhiro; Nagashima, Shigeo; Omoda, Koichiro; and Torii, Shunichi, 4,488,247, Cl. 364-765.000.
Onojima, Yoshio; Yoneda, Kenichi; Kamimura, Yoshihiko; Shimada, Akira; and Noguchi, Masahiko, to Mitsubishi Heavy Industries, Ltd. Process for treating exhaust gases. 4,487,748, Cl. 423-240.000.
Oosterbaan, DuWayne D.: *See*—
Cooley, John J.; and Oosterbaan, DuWayne D., 4,488,001, Cl. 178-22.090.
Oppenheimer, Robert H.: *See*—
George, Harvey F.; and Oppenheimer, Robert H., 4,487,122, Cl. 101-153.000.
OPT Industries, Inc.: *See*—
Clarke, Patrick W., 4,488,057, Cl. 307-66.000.
Orii, Masaru, to Kabushiki Kaisha Orii Jidoki Seisakusho. Apparatus for automatic feeding of workpiece. 4,487,409, Cl. 271-267.000.
Orita, Shunichi: *See*—
Takenaga, Hideo; Ichikawa, Hiroki; and Orita, Shunichi, 4,488,196, Cl. 360-137.000.
Ortho Diagnostic Systems Inc.: *See*—
Kamentsky, Louis A., 4,487,839, Cl. 436-518.000.
Ortho Pharmaceutical Corporation: *See*—
Mezick, James A., 4,487,782, Cl. 424-317.000.
Ortos, Ronald C., to General Electric Company. Brush wear detector. 4,488,078, Cl. 310-242.000.
O'Shea, Geraldine M.: *See*—
Goosen, Mattheus F. A.; O'Shea, Geraldine M.; and Sun, Anthony M. F., 4,487,758, Cl. 424-21.000.
Oshima, Yasushi; and Omae, Michinobu, to Yamato Scale Company, Ltd. Distribution feeder. 4,487,338, Cl. 222-196.000.
Ost, Clarence S., to Electronic Mechanical Products Co. Photographic reproduction system. 4,487,500, Cl. 355-44.000.
Ostiguy, Claude: *See*—
Lalancette, Jean M.; and Ostiguy, Claude, 4,487,624, Cl. 71-32.000.
Ostlinning, Edgar: *See*—
Idel, Karsten; Freitag, Dieter; and Ostlinning, Edgar, 4,487,698, Cl. 210-639.000.
Ostrowsky, Efrem M., to Seaquist Closures, a Division of Pittway Corporation. Tamper-evident dispensing closure. 4,487,324, Cl. 215-253.000.
Ostrup, Heinrich: *See*—
Claas, Helmut; and Ostrup, Heinrich, 4,487,005, Cl. 56-14.500.
Otis Engineering Corporation: *See*—
Gazda, Imre I., 4,487,261, Cl. 166-264.000.
Jackson, Alan T.; and Henderson, William D., 4,487,258, Cl. 166-120.000.
Otobe, Takashi; Komatsu, Yasutoshi; and Murakami, Yoshikazu, to Sony Corporation. Phase detectors for detecting a mutual phase difference between two signals. 4,488,109, Cl. 324-83.00R.
Otsubo, Toru: *See*—
Noguchi, Minori; Otsubo, Toru; Aiuchi, Susumu; Kamimura, Takashi; and Fujii, Teru, 4,487,678, Cl. 204-298.000.
Otsuka, Masao: *See*—
Matsumoto, Kenichi; Goto, Mashakatsu; Yomura, Kiyoshi; Otsuka, Masao; Hori, Koichi; and Okamura, Yoshiyuki, 4,488,023, Cl. 200-147.00R.
Otsuka Pharmaceutical Co. Ltd.: *See*—
Tominaga, Michiaki; Yang, Yung-hsiung; Ogawa, Hidenori; and Nakagawa, Kazuyuki, 4,487,772, Cl. 424-250.000.
Otten, Heinrich, to Franz Kuhlmann Praezisionsmechanik und Maschinenbau GmbH & Co. KG. Drawing machine carrriage. 4,486,957, Cl. 33-438.000.
Otto Hansel GmbH: *See*—
Hansel, Otto; and Markwardt, Klaus, 4,487,118, Cl. 99-348.000.
Ovodenko, Maxim B.: *See*—
Korshunov, Evgeny A.; Kuznetsov, Alexandr N.; Ovodenko, Maxim B.; Kuzmin, Gennady G.; Kostrov, Valery P.; Timofeev, Alexandr N.; Bastrikov, Valery L.; and Meschaninova, Tatyana V., 4,487,250, Cl. 164-473.000.
Ovshinsky, Stanford R.; Sapru, Krishna; and Reger, Arie, to Energy Conversion Devices, Inc. Fuel cell anode based on a disordered catalytic material. 4,487,818, Cl. 429-44.000.
Owens-Illinois, Inc.: *See*—
Heider, James E., 4,487,312, Cl. 206-158.000.
Juvinall, John W., 4,487,322, Cl. 209-526.000.
Richards, Ray S., 4,487,621, Cl. 65-27.000.
Uhlig, Albert R., 4,487,326, Cl. 215-307.000.
Willingham, Wendell D., 4,487,325, Cl. 215-307.000.
Oy All-Plast Ab: *See*—
Makela, Paavo; Mannisto, Kalervo; and Masalin, Heikki, 4,487,219, Cl. 137-362.000.
Oy Lohja Ab: *See*—
Lindfors, Sven G.; Antson, Jorma O.; Graeffe, Ralf; Pakkala, Arto J.; and Suntola, Tuomo S., 4,488,084, Cl. 313-506.000.
Oyama, Kiyotaka; Irino, Shigeaki; and Hagi, Norio, to Toyo Soda Manufacturing Co., Ltd.; and Sagami Chemical Research Center. Process for recovering a dipeptide derivative. 4,487,717, Cl. 260-112.50R.
Ozaki, Yoshimi: *See*—
Tanizaki, Hiroyuki; Ogawa, Takayoshi; and Ozaki, Yoshimi, 4,487,452, Cl. 297-349.000.
Ozawa, Toshiaki; Yamada, Yasuaki; and Kondo, Hiroatsu, to Canon Kabushiki Kaisha. Printer adapted to perform margin/tabulator setting function. 4,487,517, Cl. 400-279.000.
Ozawa, Tsutomu: *See*—
Kawasaki, Hironobu; Sato, Takashi; Hayashi, Tomohiko; and Ozawa, Tsutomu, 4,487,812, Cl. 428-629.000.
P. D. George Company, The: *See*—
Lange, Daniel J.; and Marquardt, Daniel J., 4,487,911, Cl. 528-125.000.
P. T. Brake Lining Company: *See*—
Kaufman, Edward R., 4,487,729, Cl. 264-26.000.
Pace Incorporated: *See*—
Parker, Oscar E., 4,487,224, Cl. 137-569.000.
Pacific Scientific Instruments Company: *See*—
Goldsmith, Herbert, 4,487,504, Cl. 356-323.000.
Packaging Materials Corporation: *See*—
Beckway, Bruce C., 4,487,136, Cl. 108-51.300.
Padamsee, Hasan S., to Cornell Research Foundation, Inc. Purification of niobium. 4,487,637, Cl. 148-6.300.
Padgett, H. Patrick: *See*—
Fisher, Gary H.; and Padgett, H. Patrick, 4,486,994, Cl. 52-303.000.
Pagano, Dominick A.; and Morris, Kevin S., to Dapco Industries, Inc. Flaw detection system for railroad rails and the like. 4,487,071, Cl. 73-612.000.
Page, Karen L.: *See*—
Bogart, Frank J.; Dedisse, Mary R.; Divakaruni, Radhakrishna S.; Fette, Charles J.; Knight, Keith S.; Page, Karen L.; and Paxton, Thornton S., 4,488,004, Cl. 179-18.0AD.
Paget, Fredrick W., to GTE Products Corporation. Starter circuit for lamps with high reignition voltages. 4,488,088, Cl. 315-101.000.
Pakkala, Arto J.: *See*—
Lindfors, Sven G.; Antson, Jorma O.; Graeffe, Ralf; Pakkala, Arto J.; and Suntola, Tuomo S., 4,488,084, Cl. 313-506.000.

Palilla, Frank C.; MacAllister, Burton W., Jr.; and McKenna, John F., to GTE Laboratories Incorporated. Method of fabricating arc limiting refractory resistive element. 4,487,732, Cl. 264-61.000.

Palilla, Frank C.; MacAllister, Burton W., Jr.; and McKenna, John F., to GTE Laboratories Incorporated. Method of fabricating arc limiting refractory resistive element. 4,487,733, Cl. 264-61.000.

Palmans, Jos, to Alliance Europe S.A. Framed board with writing surface. 4,487,586, Cl. 434-408.000.

Panora, Robert A., to Thermo Electron Corporation. Deep fat fryer with swivel filter element. 4,487,691, Cl. 210-167.000.

Panush, Sol, to Inmont Corporation. Super jet black coatings. 4,487,869, Cl. 524-90.000.

Papast-Motoren GmbH & Co. KG: *See*—
Cap, Hinrich; von der Heide, Johann; and Muller, Rolf. 4,488,096, Cl. 318-328.000.

Papazian, Samuel, to Societe de Paris et du Rhone. Starting circuit for alternator of an automotive vehicle. 4,488,105, Cl. 320-64.000.

Papenfuhs, Theodor: *See*—
Arndt, Otto; and Papenfuhs, Theodor, 4,487,725, Cl. 260-507.00R.

Pardi, Rodolfo; and Marchi, Giorgio, to Logic S.p.A. System for sensing and signalling the amount of fuel in a vehicle tank, particularly aircraft tank. 4,487,066, Cl. 73-304.00C.

Paris, Edward S., to Vamco Machine and Tool, Inc. Apparatus for adjusting the feed length of strip material to a press. 4,487,352, Cl. 226-142.000.

Parker, Edward: *See*—
Parker, Jeffrey L.; and Parker, Edward, 4,487,363, Cl. 236-49.000.

Parker Electronics, Inc.: *See*—
Parker, Jeffrey L.; and Parker, Edward, 4,487,363, Cl. 236-49.000.

Parker, Jeffrey L.; and Parker, Edward, to Parker Electronics, Inc. Bypass control system to maintain a constant air supply pressure in a HVAC duct system. 4,487,363, Cl. 236-49.000.

Parker, Oscar E., to Pace Incorporated. Air switch and filter combination. 4,487,224, Cl. 137-569.000.

Parker, Robert; and Reed, James P., to Raychem Corporation. Anticorrosion anode with magnetic holddown. 4,487,676, Cl. 204-196.000.

Parker, Ronald G. Fireplace fire starter. 4,487,572, Cl. 431-331.000.

Parlman, Robert M.; and Selman, Charles M., to Phillips Petroleum Company. Benzenediazonium tetrafluoroborate/titanium tetrahalide-based catalysts. 4,487,844, Cl. 502-104.000.

Parmentier, Jan A. Sail batten. 4,487,146, Cl. 114-102.000.

Paulean, James H.; and Steele, Charles S., to Texaco Inc. Method of decolorizing mixtures of aminoethylpiperazine, a polyoxypropylenediamine and alkylphenols with N,N-diethylhydroxylamine. 4,487,987, Cl. 568-756.000.

Passerell, David P.; and Volgstadt, Frank R., to Perfection Corporation. No-hole insertion joint. 4,487,432, Cl. 285-15.000.

Patel, Raman: *See*—
Coran, Aubert Y.; and Patel, Raman, 4,487,888, Cl. 525-132.000.

Patel, Shantilal G.; and Bell, William D., to International Playtex, Inc. Spun polyester warp knit. 4,487,040, Cl. 66-195.000.

Patpan, Inc.: *See*—
duBourg, Jean-Pierre, 4,487,041, Cl. 69-1.000.

Patterson, W. W., III: *See*—
Grapes, Eugene F.; and Patterson, W. W., III, 4,487,442, Cl. 294-83.00R.

Paul Forkardt GmbH & Co. KG: *See*—
Schmitz, Karl-Heinz; and Steinberger, Josef, 4,487,078, Cl. 73-862.060.

Paul, Volker: *See*—
Grohe, Klaus; and Paul, Volker, 4,487,783, Cl. 424-322.000.

Pawlowski, Michael: *See*—
Pounder, Edwin; Arena, Alan J.; Pawlowski, Michael; and Totten, Adrian M., 4,487,333, Cl. 222-54.000.

Paxton, Thornton S.: *See*—
Bogart, Frank J.; Dedisse, Mary R.; Divakaruni, Radhakrishna S.; Fette, Charles J.; Knight, Keith S.; Page, Karen L.; and Paxton, Thornton S., 4,488,004, Cl. 179-18.0AD.

Payne, George B., to Shell Oil Company. Preparation of 2-exo-Hydroxy-7-oxabicyclo[2.2.1]heptanes. 4,487,945, Cl. 549-463.000.

PDA Engineering: *See*—
Jackson, Robert E., 4,487,478, Cl. 350-622.000.

Peebles, Douglas D., to Motorola, Inc. Snap action removable knob. 4,486,918, Cl. 16-121.000.

Peet, Norton P.; and Alexander, Catherine A., to Dow Chemical Company, The. 6-[(Cyclic amino)alkylamino]-tetrahydrotriazolo[3,4-a]phthalazines. 4,487,930, Cl. 544-234.000.

Pegram, Warren J., to AMP Incorporated. Releasable grommet. 4,487,998, Cl. 174-153.00G.

Pelacani, Alberto: *See*—
Ascarelli, Paolo; Boccalon, Gianfranco; Moretti, Giuliano; Nitico', Nicola; and Pelacani, Alberto, 4,487,810, Cl. 428-461.000.

Pemberton, Martin J.: *See*—
Withnall, Malcolm D. N.; Pemberton, Martin J.; and McManus, Kevin, 4,488,035, Cl. 235-384.000.

Pennebaker, William B.: *See*—
Mitchell, Joan L.; and Pennebaker, William B., 4,488,174, Cl. 358-136.000.

Perfection Corporation: *See*—
Passerell, David P.; and Volgstadt, Frank R., 4,487,432, Cl. 285-15.000.

Perfex Corporation: *See*—
Kubick, Matthew D., 4,486,913, Cl. 15-159.00R.

Perini, Fabio, to Finanziaria Luochese S.p.A. Web winding apparatus and method. 4,487,377, Cl. 242-56.800.

Perkin-Elmer Corporation, The: *See*—
Helms, Charles C.; and Atwood, John G., 4,487,477, Cl. 350-172.000.

Perkins, Curtis L.: *See*—
Leaseburge, Emory J.; and Perkins, Curtis L., 4,487,080, Cl. 73-863.830.

Perkins, Geoffrey W.; and Lunn, Gerald K., to Motorola, Inc. T.V. Integrator circuit and horizontal oscillator. 4,488,177, Cl. 358-158.000.

Peroutky, Donald C., to General Electric Company. Dispenser for screw fastener nuts. 4,487,093, Cl. 81-57.370.

Peroutky, Donald C.: *See*—
Case, Allen W., Jr.; Kuchar, Norman R.; and Peroutky, Donald C., 4,488,032, Cl. 219-124.340.

Perry, E. Robert: *See*—
Rabinowitz, Mario; and Perry, E. Robert, 4,487,996, Cl. 174-105.00R.

Perry, James C.; and Wright, Dolph D., to General Motors Corporation. Paint color change and flow control system. 4,487,367, Cl. 239-112.000.

Perry, Michael J.: *See*—
Fisher, Jeremy F.; Mundy, Anthony C.; and Perry, Michael J., 4,486,955, Cl. 33-262.000.

Peters, Albin, to Wico Corporation. Rotatable kicker for pinball game. 4,487,416, Cl. 273-129.00V.

Peters, John V.: *See*—
Fancey, Everett G.; Peters, John V.; and Tucker, Russell E., 4,486,967, Cl. 43-4.500.

Peterson, James L.: *See*—
Waldo, David T.; Peterson, James L.; and Grimes, William D., 4,487,228, Cl. 138-96.00T.

Petit, Andre ; and Jamet, Daniel, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Series/parallel electrical connector, particularly for use with chassis-mounted printed circuit cards. 4,487,466, Cl. 339-32.00M.

Petrie, Adelore F., to Motorola, Inc. Speed dependent ignition controller and method. 4,487,183, Cl. 123-418.000.

Petro, Don. Electronically controlled fluid floro regulating system. 4,487,187, Cl. 123-478.000.

Pezzoli, Paul A.: *See*—
Walton, Kim L.; and Pezzoli, Paul A., 4,487,891, Cl. 525-222.000.

Pfaff, Gerhard; and Wick, Albert, to Siemens Aktiengesellschaft. Method and apparatus for controlling the load current of a pulsed frequency converter. 4,488,215, Cl. 363-159.000.

Pfaff Industriemaschinen GmbH: *See*—
Vollmar, Kurt, 4,487,145, Cl. 112-320.000.

Pfannkuch, Werner H. G.: *See*—
Maier-Hunke, Horst-Werner; Pfannkuch, Werner H. G.; and Vieler, Friedrich, 4,487,520, Cl. 402-65.000.

Pfeifer, Josef: *See*—
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Pfeiffer, Richard, to Transformatoren Union Aktiengesellschaft. Transformer with windings completely embedded in cast resin. 4,488,134, Cl. 336-58.000.

Pfrimmer-Viggo GmbH & Co. KG: *See*—
Iwatachenko, Peter; and Giebler, Fritz, 4,487,604, Cl. 604-153.000.

Phan Tich, Du: *See*—
Chataignon, Andre ; Poirier, Jean-Pierre; and Phan Tich, Du, 4,488,007, Cl. 179-81.00B.

Phillips, Glyn O.: *See*—
Balazs, Endre A.; Wedlock, David J.; and Phillips, Glyn O., 4,487,865, Cl. 524-29.000.

Phillips Petroleum Company: *See*—
Drake, Charles A., 4,487,970, Cl. 568-342.000.
Gaughan, Roger G., 4,487,979, Cl. 568-816.000.
Knudsen, Ronald D., 4,487,847, Cl. 502-155.000.
Kukes, Semyon, 4,487,986, Cl. 585-645.000.
Needham, Donald G., 4,487,879, Cl. 524-423.000.
Parlman, Robert M.; and Selman, Charles M., 4,487,844, Cl. 502-104.000.
Stapp, Paul R., 4,487,703, Cl. 252-8.55D.
Wiley, Bruce F., 4,487,056, Cl. 73-38.000.

Pichelman, Franklin D.; and Domaas, Perry M., to Flo-Pac Corporation. Scarifying machine. 4,486,931, Cl. 29-81.00J.

Pickel, Hans: *See*—
Neitz, Alfred; Pickel, Hans; and D'Alfonso, Nunzio, 4,487,178, Cl. 123-276.000.

Pierce, Mel P.; and Merrill, Kenneth O. Backpack chair. 4,487,345, Cl. 224-155.000.

Pierrat, Michel A. Speed reducer and method for reducing blacklash. 4,487,091, Cl. 74-805.000.

Pieters, Wim J. M.: *See*—
Gates, William E.; and Pieters, Wim J. M., 4,487,213, Cl. 137-2.000.

Pigeon, Michel: *See*—
David, Bernard; and Pigeon, Michel, 4,488,114, Cl. 324-225.000.

Pinkston, Patrick E.: *See*—
Lang, Stephen P.; Martin, Yolanda E.; and Pinkston, Patrick E., 4,488,140, Cl. 340-57.000.

Pioneer Electronic Corporation: *See*—
Matsuda, Norio; Wada, Yasumitsu; and Chijiiwa, Masaru, 4,488,012, Cl. 179-115.50R.

Piteo, Michael J., to R. E. Phelon Company, Inc. Solid state ignition system having drift-free timing. 4,487,191, Cl. 123-652.000.

Pitney Bowes Inc.: *See*—
Bernard, Richard A.; Alusik, Anthony A.; and Ananthamurthy, Bettadapur S., 4,487,636, Cl. 148-6.100.

Pittman, Robert W.; and Fontaine, Marc F., to Texaco Inc. In situ production of hydrocarbons including shale oil. 4,487,260, Cl. 166-259.000.

Pittsburgh-Des Moines Corporation: *See*—
Myers, Clarence H., 4,486,988, Cl. 52-192.000.

Pittway Corporation: *See*—
Rork, Gerald D.; Thorp, Edward J.; and Zegarski, Ronald J., 4,488,044, Cl. 250-381.000.

Pizzini, Louis C.: *See*—
Reichel, Curtis J.; Levis, William W., Jr.; and Pizzini, Louis C., 4,487,853, Cl. 521-172.000.

Planten, Staffan; and Askeroth, Torbjorn. Tooth brush for cleaning and care of the teeth. 4,486,914, Cl. 15-167.00A.

Plaschkes, Arnon: *See*—
Buurman, Cornelis; and Plaschkes, Arnon, 4,487,510, Cl. 366-337.000.

Plastics Engineering Company: *See*—
Lee, Chung J., 4,487,894, Cl. 525-423.000.

Plempel, Manfred: *See*—
Elbe, Hans-Ludwig; Jautelat, Manfred; Buchel, Karl H.; Schaller, Klaus; and Plempel, Manfred, 4,487,776, Cl. 424-269.000.

Plesko, George A., to Mars, Incorporated. Inductive coin sensor for measuring more than one parameter of a moving coin. 4,488,116, Cl. 324-236.000.

Plummer, Ernest L., to FMC Corporation. Insecticidal esters derived from benzocycloalkane-thiophenemethyl compounds. 4,487,778, Cl. 424-275.000.

Plunkett, Luther C., Jr., to Lanier Business Products, Inc. Remote dictation transcription system. 4,488,274, Cl. 369-24.000.

Podhrasky, Robert J., to Garrett Electronics. Low battery voltage indicator circuit for a metal detector. 4,488,115, Cl. 324-329.000.

Poetsch, Dieter: *See*—
Zappen, Hans-W.; Poetsch, Dieter; Lehmann, Klaus; Zimmermann, Friedrich; and Muller, Klaus D., 4,488,052, Cl. 250-578.000.

Poirier, Jean-Pierre: *See*—
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Pokorny, Richard J., to Minnesota Mining and Manufacturing Company. Wire coating composition. 4,487,876, Cl. 524-390.000.

Polaroid Corporation: *See*—
Freeman, William T., 4,488,244, Cl. 364-525.000.

Polis, Yanis J.: *See*—
Biseniex, Egils A.; Veveris, Maris M.; Dubur, Gunar Y.; Polis, Yanis J.; Uldrikis, Yan R.; Barmenkova, Natalia V.; and Kimenis, Agris A., 4,487,932, Cl. 546-285.000.

Pollard, Christopher A.: *See*—
Berg, Thomas E.; and Pollard, Christopher A., 4,488,095, Cl. 318-38.000.

Polymer Machinery Corporation: *See*—
Sansoucy, David E., 4,487,310, Cl. 198-524.000.

Pomeroy, Dan M.; and Burmester, Russell F. Portable core drill. 4,487,271, Cl. 173-29.000.

Pomeroy, Richard J., to Glenayre Electronis, Ltd. Railway brake pressure monitor. 4,487,060, Cl. 73-129.000.

Pope, James M.; Harrison, Don E.; and Lahoda, Edward J., to Westinghouse Electric Corp. Cinder aggregate from PUREX waste. 4,487,711, Cl. 252-629.000.

Portner, Peer M.: *See*—
LaForge, David H.; and Portner, Peer M., 4,488,099, Cl. 318-561.000.

Portoghese, Joseph: *See*—
Allen, John H.; Portoghese, Joseph; Hebb, Richard C.; and Breglia, Denis R., 4,487,584, Cl. 434-44.000.

Possis Medical, Inc.: *See*—
Possis, Zinon C.; and Nicoloff, Demetre M., 4,487,567, Cl. 425-403.000.

Possis, Zinon C.; and Nicoloff, Demetre M., to Possis Medical, Inc. Apparatus for making a vascular graft. 4,487,567, Cl. 425-403.000.

Potapov, Ivan N.: *See*—
Danchenko, Valentin N.; Zayats, Alexandr A.; Potapov, Ivan N.; Finagin, Petr M.; and Kutsenko, Sergei P., 4,487,049, Cl. 72-208.000.

Potters Supply Company, The: *See*—
Irwin, David M., 4,487,579, Cl. 432-241.000.

Pounder, Edwin; Arena, Alan J.; Pawlowski, Michael; and Totten, Adrian M., to Signet Scientific Co. Fluid dispensing system. 4,487,333, Cl. 222-54.000.

Power Tork Hydraulics, Inc.: *See*—
Collins, Bobby W., 4,487,095, Cl. 81-57.390.

PPG Industries, Inc.: *See*—
Claassen, George R.; and Ewing, John J., 4,487,623, Cl. 65-106.000.
DeTorre, Robert P., 4,487,350, Cl. 225-2.000.
Duffer, Paul F.; Kelly, Joseph D.; and Franz, Helmut, 4,487,807, Cl. 428-422.000.
Watson, James C., 4,487,797, Cl. 428-268.000.

Preston, Leonard: *See*—
Pugsley, Peter C.; and Preston, Leonard, 4,488,171, Cl. 358-76.000.

Prevost, David L.: *See*—
Smith, Franklin G.; and Prevost, David L., 4,487,292, Cl. 182-234.000.

Price, I. Garth. Programmable alarm clock apparatus. 4,487,512, Cl. 368-66.000.

Priesch, Manfred: *See*—
Koerner, Gotz; Priesch, Manfred; Rau, Harald; and Schamberg, Eckehard, 4,487,809, Cl. 428-447.000.

Primati, Marco: *See*—
Valori, Giuseppe; Primati, Marco; and Stevens, Victor G., 4,486,940, Cl. 29-509.000.

Prince, Brian E., to Worcester Controls Corporation. Apparatus for generating reciprocatory motion. 4,487,111, Cl. 92-110.000.

Printiss, Frederick H., Sr.: *See*—
Kicinski, Kenneth J.; Printiss, Frederick H., Sr.; and Jasemsky, Richard J., 4,487,289, Cl. 181-252.000.

Procter & Gamble Company, The: *See*—
Kaminsky, George J., 4,487,710, Cl. 252-546.000.

Prost, Roger: *See*—
Meignin, Jacques; Mollaret, Daniel; and Prost, Roger, 4,487,037, Cl. 62-514.00R.

Provan, Alexander R., to Mobil Oil Corporation. Holder for facilitating loading of plastic bags. 4,487,388, Cl. 248-97.000.

Pugsley, Peter C.; and Preston, Leonard, to Crosfield Electronics Limited. Image reproduction. 4,488,171, Cl. 358-76.000.

Pugsley, Peter C.: *See*—
Dalke, George W.; and Pugsley, Peter C., 4,488,245, Cl. 364-526.000.

Puritan-Bennett Corporation: *See*—
Oiesen, Russell, 4,487,155, Cl. 116-70.000.

Putzar, Roland, to Ciba-Geigy Corporation. Powdered, stably dispersible, non-foaming dye formulations and process for their preparation. 4,487,609, Cl. 8-524.000.

Quay, Marvin F.: *See*—
Meissner, Konrad E.; and Quay, Marvin F., 4,487,307, Cl. 198-394.000.

Quermann, Thomas R., to Sperry Corporation. Pick-off, torquer, and reference signal generator for free rotor gyroscopes. 4,487,083, Cl. 74-5.460.

Quick, Terrence R.; and Oliver, Larry R., to Dayco Corporation. Pulley construction for a V-belt and method of making the same. 4,487,595, Cl. 474-15.000.

Quiogue, Honesto D., to Harvey Hubbell Incorporated. Floodlight luminaire with rotatable reflector. 4,488,205, Cl. 362-223.000.

Quirk, Jeffrey L.: *See*—
Ciambarella, Ernest; and Quirk, Jeffrey L., 4,487,201, Cl. 128-134.000.

R. E. Phelon Company, Inc.: *See*—
Piteo, Michael J., 4,487,191, Cl. 123-652.000.

Rabiner, Lawrence R.: *See*—
Brown, Michael K.; and Rabiner, Lawrence R., 4,488,243, Cl. 364-513.500.

Rabinowitz, David B., to Chyron Corporation. Video switching. 4,488,180, Cl. 358-183.000.

Rabinowitz, Mario; and Perry, E. Robert, to Electric Power Research Institute, Inc. Shielded electrical cable. 4,487,996, Cl. 174-105.00R.

Racine Federated Inc.: *See*—
Lake, Jack E., 4,487,077, Cl. 73-861.580.

Rademacher, Paul: *See*—
Di Matteo, Paul; Rademacher, Paul; and Stern, Howard, 4,488,173, Cl. 358-107.000.

Raduechel, Bernd: *See*—
Skuballa, Werner; Raduechel, Bernd; Schwarz, Norbert; Vorbrueggen, Helmut; and Elger, Walter, 4,487,953, Cl. 560-55.000.

Raha-Automaattiyhdistys: *See*—
Karkkainen, Martti; and Martti, Lauri, 4,487,414, Cl. 273-371.000.

Rahlwes, Kurt; Illgner, Wolfram; and Reimann, Dieter. Tie-anchor for reinforcing cable. 4,486,991, Cl. 52-223.00L.

Raj, Rishi; and Baik, Sunggi, to Cornell Research Foundation, Inc. Use of silicon in liquid sintered silicon nitrides and sialons. 4,487,840, Cl. 501-97.000.

Rampel, Hans; Dinkel, Emil; and Schulz, Volkmar, to Metallwerk Max Brose GmbH & Co. Seat adjustment mechanism particularly for a motor vehicle seat. 4,487,391, Cl. 248-429.000.

Randall, Thomas B. Screw type blind rivet driver adapter. 4,487,096, Cl. 81-121.00A.

Rantell, Terry D.: *See*—
Clarke, James W.; Kimber, Geoffrey M.; and Rantell, Terry D., 4,487,682, Cl. 208-8.0LE.

Rasmussen, Holger; Jespersen, Paul W.; and DeLuca, Raymond F., to Georgia-Pacific Corporation. Roll transfer mechanism for web material dispenser. 4,487,375, Cl. 242-55.300.

Ratheiser, Heinz, to American Maplan Corporation. Extruder provided with preheating stage. 4,487,508, Cl. 366-91.000.

Ratton, Serge, to Rhone-Poulenc Industries. Etherification of phenols. 4,487,975, Cl. 568-587.000.

Raty, Dallas L.: *See*—
De Vaughn, Donald H.; Watts, Philip S.; Raty, Dallas L.; and Maker, Edward H., II, 4,487,081, Cl. 73-864.130.

Rau, Harald: *See*—
Koerner, Gotz; Priesch, Manfred; Rau, Harald; and Schamberg, Eckehard, 4,487,809, Cl. 428-447.000.

Rawlings, Herbert L.; and Reinert, Gerard E., to Mobay Chemical Corporation. Impact improvement of reinforced polycarbonate/ABS blends. 4,487,881, Cl. 524-504.000.

Ray, David J.: *See*—
Kapadia, Nikul S.; and Ray, David J., 4,488,240, Cl. 364-508.000.

Raychem Corporation: *See*—
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Raytheon Company: *See*—
Dauphine, Thonet C., 4,487,257, Cl. 166-60.000.

Dudley, Kenneth W.; Eves, E. Eugene, II; and Stone, William R., 4,488,027, Cl. 219-10.55A.
Vassar, Edward R., 4,488,252, Cl. 364-748.000.
Ward, Harold R., 4,488,154, Cl. 343-9.00R.

RCA Corporation: *See*—
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Brauer, Eric A., 4,488,285, Cl. 369-170.000.
Chung, Kwong T., 4,488,282, Cl. 369-135.000.
Chung, Kwong T., 4,488,283, Cl. 369-135.000.
Dieterich, Charles B., 4,488,278, Cl. 369-50.000.
Haferl, Peter E., 4,488,181, Cl. 358-220.000.
Jebens, Robert W., 4,488,280, Cl. 369-77.200.
Koslov, Joshua L.; and Wagner, Theodor M., 4,488,178, Cl. 358-163.000.
Steinmetz, Carl C., 4,487,673, Cl. 204-181.00R.
Wolkstein, Herbert J., 4,488,122, Cl. 330-149.000.
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Ream, Bernard C.; Henry, Joseph P.; and Kapicak, Louis A., to Union Carbide Corporation. Process for preparing a diester of oxalic acid. 4,487,958, Cl. 560-204.000.

Rebres, Robert P.: *See*—
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Recchuite, Alexander D., to Sun Ventures, Inc. Oil containing a cosulfurized olefin-triglyceride blend. 4,487,705, Cl. 252-46.600.

Reed, James P.: *See*—
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Reed, James R., to General Motors Corporation. Monolith extrusion die construction method. 4,486,934, Cl. 29-163.50R.

Reed, Randall A.: *See*—
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Reed, Robert L., to Standard Oil Company (Indiana). System and process for producing and recovering elemental sulfur. 4,487,754, Cl. 423-574.00R.

Rees, Richard W. A., to General Motors Corporation. Seat slide structure. 4,487,459, Cl. 308-3.00R.

Reger, Arie: *See*—
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Reich, Egon: *See*—
Reich, Egon, II, 4,487,446, Cl. 296-106.000.

Reich, Egon, II, to Reich, Egon. Combined bumper and air storage system. 4,487,446, Cl. 296-106.000.

Reichel, Curtis J.; Levis, William W., Jr.; and Pizzini, Louis C., to BASF Wyandotte Corporation. Low ethylene oxide/high primary hydroxyl content polyether-ester polyols and polyurethane foams based thereon. 4,487,853, Cl. 521-172.000.

Reimann, Dieter: *See*—
Rahlwes, Kurt; Illgner, Wolfram; and Reimann, Dieter, 4,486,991, Cl. 52-223.00L.

Reinehr, Dieter; and Pfeifer, Josef, to Ciba-Geigy Corporation. Substituted 1,11-diaminoundecanes, processes for producing them, and their use. 4,487,947, Cl. 549-492.000.

Reinert, Gerard E.: *See*—
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Reiss, Kurt: *See*—
Lehmann, Peter; Mohr, Dieter; and Reiss, Kurt, 4,487,823, Cl. 430-56.000.

Reitemeyer, Frank J. Releasable grip-lock device for flexible elongate connectors and structures accommodating livestock. 4,486,979, Cl. 49-347.000.

Reiter, Norbert, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Polygonal cutting bit. 4,487,534, Cl. 407-114.000.

Remp, Thomas E., Jr.: *See*—
Dreyfuss, Wilfried; Remp, Thomas E., Jr.; and Muller, Kurt, 4,487,229, Cl. 138-96.00T.

REMS-WERK Christian Foll und Sohne GmbH & Co.: *See*—
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Renault Techniques Nouvelles Appliquees: *See*—
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REPA Feinstanzwerk, GmbH: *See*—
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Repik, Clyde P.; and Leatherman, Alfred F., to Heller, William C., Jr. Enclosed moist pad assembly with removable cover. 4,487,313, Cl. 206-205.000.

Repp, Thomas J.; and Rebres, Robert P., to Xerox Corporation. Reversing roll inverter with bypass capability. 4,487,506, Cl. 355-14.0SH.

Research Corporation: *See*—
Day, Donal F.; and Workman, Wesley E., 4,487,831, Cl. 435-99.000.

Resnick, Paul R.: *See*—
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Reto, Anthony J.: *See*—
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Rettig, Charles E., to MagneTek Inc. Voltage limit protection circuit for phase controlled rectifiers. 4,488,212, Cl. 363-54.000.

Reven, Frederick V., to Nalco Chemical Company. Coating to prevent the oxidation of electrodes during electric furnace steel making. 4,487,804, Cl. 428-408.000.

Rheinmetall GmbH: *See*—
Luebbers, Willi, 4,487,127, Cl. 102-253.000.
Luther, Hans W., 4,487,131, Cl. 102-523.000.
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Rhone-Poulenc Industries: *See*—
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Richards, Janet A.: *See*—
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Richards, Ray S., to Owens-Illinois, Inc. Method of sealing glass furnaces to prevent air leakage. 4,487,621, Cl. 65-27.000.

Richards, Terry E.; and Richards, Janet A. Thermally operated propeller assembly. 4,487,193, Cl. 126-58.000.

Richer, Larry A.: *See*—
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Richter, Roland; Muller, Hanns P.; and Wagner, Kuno, to Bayer Aktiengesellschaft. Process for the preparation of polyisocyanates containing isocyanurate groups, and the use of the products of the process as isocyanate component in the production of polyurethanes. 4,487,928, Cl. 544-193.000.

Ricoh Company, Ltd.: *See*—
Suzuki, Shigeru; Koizumi, Yutaka; Yanagawa, Nobuyuki; Hirakura, Koji; and Imai, Chikara, 4,487,501, Cl. 355-50.000.

Ridgeway, William V. Orthodontic bracket holder. 4,487,580, Cl. 433-3.000.

Rieder, Georg L., to SKW Trostberg. Method for interrupting bud dormancy. 4,487,625, Cl. 71-77.000.

Rief, Rolf: *See*—
Neidig, Arno; Hettmann, Hubert; Leukel, Bernd; and Rief, Rolf, 4,488,167, Cl. 357-74.000.

Rikimaru, Roy K.: *See*—
Young, Frederick A.; Ahulii, Robert J.; and Rikimaru, Roy K., 4,488,130, Cl. 333-203.000.

Riley, Richard L.: *See*—
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Rilling, Raymond J.: *See*—
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Rininger, David P.: *See*—
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Rink, Frederick J., Jr.: *See*—
Archibald, James B.; and Rink, Frederick J., Jr., 4,488,072, Cl. 310-71.000.

Risse, Wilhelm: *See*—
Heitz, Walter; and Risse, Wilhelm, 4,487,918, Cl. 528-212.000.

Ritter, Urs: *See*—
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Ward, William J., III; Gaines, George L., Jr.; and Ritzer, Alan, 4,487,950, Cl. 556-472.000.

Rizzotto, Vittorino: *See*—
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Robbins, Edward J.: *See*—
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Robbins, Michael F.: *See*—
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Boning, Bernward; Bone, Rainer; Nagel, Rudolf; and Sellmaier, Franz, 4,487,184, Cl. 123-425.000.
Feilhauer, Michael; Holzinger, Otto; Vits, Klaus; and Wurst, Bert, 4,488,299, Cl. 371-20.000.
Fischer, Werner; Kniss, Helmut; and Locher, Johannes, 4,487,059, Cl. 73-116.000.
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Horbelt, Michael; and Arnold, Herbert, 4,487,189, Cl. 123-491.000.
Kruger, H. Eckhard; Freienstein, Bernd; and Schafer, Thomas, 4,488,179, Cl. 358-181.000.
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Wahl, Josef; and Schmidt, Peter, 4,487,186, Cl. 123-436.000.
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Zappen, Hans-W.; Poetsch, Dieter; Lehmann, Klaus; Zimmermann, Friedrich; and Muller, Klaus D., 4,488,052, Cl. 250-578.000.

Roberts, James K., to Bendix Corporation, The. Drum brake assembly and adjuster therefor. 4,487,298, Cl. 188-79.5GE.

Roberts, Peter R., to Nuclear Metals, Inc. Rotary electrode disc apparatus. 4,488,031, Cl. 219-69.00R.

Robertson, Wayne; Briggs, Eugene C.; and Briggs, Keith E. Oil combustion system. 4,487,571, Cl. 431-208.000.

Robinson, Cyril; and Thomson, Alexander, to United Kingdom Atomic Energy Authority. Temperature surveillance systems. 4,488,269, Cl. 136-213.000.

Robinson, Delmar W.; Johnson, Russell W.; and Moser, Mark D., to UOP Inc. Indium-containing catalyst for reforming hydrocarbons. 4,487,848, Cl. 502-223.000.

Robinson, Michael; and Crosby, Alan D., to Laporte Industries Limited. Production of metal chlorides. 4,487,747, Cl. 423-60.000.

Roblee, Leland H. S., Jr.: *See*—
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Robotic Vision Systems, Inc.: *See*—
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Roche, Joseph R., to Hydril Company. Union-type coupling for marine drilling riser pipe. 4,487,434, Cl. 285-93.000.
Rockcor, Inc.: *See*—
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Rockwell International Corporation: *See*—
Davis, James A.; and Moon, Lamar F., 4,487,366, Cl. 239-11.000.
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Treise, Jan E.; and Beningfield, Harley W., 4,488,108, Cl. 324-83.00D.
Rodda, Donald; and Odermann, Charles R., to Singer Company, The. Bobbin case chain stitch insert. 4,487,142, Cl. 112-168.000.
Rodgers, Leonard J., to Rolls-Royce Limited. Exhaust mixer for turbofan aeroengine. 4,487,017, Cl. 60-262.000.
Rodi, Anton; Schmidt, Edgar; and Uhrig, Dieter, to Heidelberger Druckmaschinen AG. Electrical safety device for controlling a printing machine. 4,488,107, Cl. 323-340.000.
Rodriguez, Luis R.: *See*—
Armbruster, David R.; and Rodriguez, Luis R., 4,487,868, Cl. 524-44.000.
Rodriquez, Rodrigo, to Cassina SpA. Armchair convertible into chaise longue with separate hinged base and tilting head rest. 4,487,450, Cl. 297-111.000.
Roen, Ralph M., to T. C. Manufacturing Co. Bag dispensing package. 4,487,318, Cl. 206-554.000.
Rogers, M. Maurice. On-premise telephone test jack. 4,488,011, Cl. 179-175.110.
Rogers, Richard D.; and Hopkinson, Harold H., to Carrier Corporation. Method and apparatus for controlling compressor capacity. 4,487,031, Cl. 62-160.000.
Rohr Industries, Inc.: *See*—
Brown, William D.; and Veta, Ross E., 4,487,794, Cl. 428-137.000.
Rolls-Royce Limited: *See*—
Rodgers, Leonard J., 4,487,017, Cl. 60-262.000.
Slattery, Sidney E.; Henshaw, Harry; and Havercroft, Peter, 4,487,015, Cl. 60-39.320.
Rondo Building Services Pty. Limited: *See*—
Hunter, Richard H.; and Heins, Karl, 4,486,927, Cl. 29-6.100.
Rooney, Francis J.: *See*—
Rooney, William J.; and Rooney, Francis J., 4,488,137, Cl. 337-162.000.
Rooney, William J.; and Rooney, Francis J., to Commercial Enclosed Fuse Company. Composite fuse links employing dissimilar fusible elements in a series. 4,488,137, Cl. 337-162.000.
Roper, Jerry M.: *See*—
Everly, Charles R.; and Roper, Jerry M., 4,487,722, Cl. 260-465.00F.
Rork, Gerald D.; Thorp, Edward J.; and Zegarski, Ronald J., to Pittway Corporation. Ionization chamber for smoke detector and the like. 4,488,044, Cl. 250-381.000.
Rose, David; and Maak, Norbert, to Henkel Kommanditgesellschaft auf Aktien. Oxidation hair dyes containing 5-halo-2,3-pyridine-diols as coupler components. 4,487,607, Cl. 8-408.000.
Rosen, William E.: *See*—
Berke, Philip A.; and Rosen, William E., 4,487,939, Cl. 548-311.000.
Rosenberg, Heinz-Jurgen: *See*—
Mohn, Hans-Werner; and Rosenberg, Heinz-Jurgen, 4,487,650, Cl. 156-567.000.
Rosenthal, Robert D., to Trebor Industries, Inc. Instrument for providing automatic measurement of test weight. 4,487,278, Cl. 177-25.000.
Rossi, Carlo: *See*—
Semeghini, Gian L.; Ferrari, Roberto; Rizzotto, Vittorino; Omacini, Alberto; and Rossi, Carlo, 4,487,647, Cl. 156-181.000.
Roth, Christian: *See*—
Bauer, Kurt; Hesch, Georg; Huber, Hans; Markert, Helmut; and Roth, Christian, 4,487,053, Cl. 72-335.000.
Rothfuss, Robert G.; and Kuhl, David K., to Senco Products, Inc. Extractor for surgical staples. 4,487,394, Cl. 254-28.000.
Roussel Uclaf: *See*—
Heymes, Rene, 4,487,937, Cl. 548-194.000.
Krief, Alain, 4,487,955, Cl. 560-124.000.
Martel, Jacques; Tessier, Jean; and Demoute, Jean-Pierre, 4,487,957, Cl. 560-177.000.
Routhier, Dominique, to SEB S.A. Culinary appliance for preparing sandwiches of the type known as "hamburgers". 4,487,116, Cl. 99-339.000.
Rouzaud, Guy, to Centre D'Etudes Du Fraisage. Distributing device of the pressure exerted by a machine-tool carriage on its slides. 4,487,536, Cl. 409-239.000.
Rowe, Donald H., to GTE Products Corporation. Fiber optic sensor. 4,488,040, Cl. 250-227.000.
Roy, Donald H. Insulating structure. 4,486,997, Cl. 52-404.000.
Ruben, Samuel. Galvanic cell with tin fluoborate electrolyte. 4,487,822, Cl. 429-199.000.
Rubey, Wolfgang; Baitz, Gunter; Malke, Wolfgang; and Noack, Harald, to Nixdorf Computer AG. Apparatus for printing on receipt forms or the like. 4,487,519, Cl. 400-534.000.
Rudolph, Karl-Heinz: *See*—
Kniege, Wilfried; Michel, Werner; Ackermann, Jurgen; and Rudolph, Karl-Heinz, 4,487,906, Cl. 528-15.000.
Rudy, Marion F. Spring moderator for articles of footwear. 4,486,964, Cl. 36-28.000.
Ruehle, William H., to Mobil Oil Corporation. Acoustic impedance log obtained from seismograms. 4,488,270, Cl. 367-73.000.
Ruggles, Thomas P. Tilting wheel vehicle suspension system. 4,487,429, Cl. 280-772.000.
Russin, Leonid P. Method of controlling revolution of drive shaft external combustion engine and Russin external combustion engine. 4,487,107, Cl. 91-471.000.
Ruti-Te Strake B.V.: *See*—
Gunneman, Paul, 4,487,236, Cl. 139-435.000.
Rutty, Edward C.: *See*—
Drechsler, Mark A.; and Rutty, Edward C., 4,487,379, Cl. 242-107.000.
Ruyak, Robert F.; Silver, Theodore R.; and Tomasino, Rocco J., to Autoclave Engineers. Magnetically driven centrifugal pump. 4,487,557, Cl. 417-420.000.
Ryan, Philip M.: *See*—
Bond, George L.; Cartman, Frank P.; and Ryan, Philip M., 4,488,298, Cl. 371-11.000.
Ryden, William D.; Hanson, Matthew V.; Derbenwick, Gary F.; Gnadinger, Alfred P.; and Adams, James R., to Inmos Corporation. Zero drain overlap and self aligned contact method for MOS devices. 4,486,943, Cl. 29-571.000.
S. Franzen Sohne (GmbH & Co.): *See*—
Milles, Peter, 4,487,043, Cl. 70-312.000.
Saalmann, Gunter; and Haslberger, Richard, to Lang Apparatebau GmbH. Metering method for supplying detergent concentrate. 4,486,910, Cl. 8-158.000.
Sacerio, Jose L.: *See*—
Jeffers, Edward A.; McLeroy, R. Philip; and Sacerio, Jose L., 4,488,118, Cl. 324-455.000.
Sachse, Hans. Testis support for elevating and treating diseased testes and epididymides. 4,487,202, Cl. 128-158.000.
Sagami Chemical Research Center: *See*—
Oyama, Kiyotaka; Irino, Shigeaki; and Hagi, Norio, 4,487,717, Cl. 260-112.50R.
Sainen, Tsutomu: *See*—
Sugita, Katsuhiko; and Sainen, Tsutomu, 4,487,235, Cl. 139-370.200.
Saint-Sevin, Michel: *See*—
Grandjacques, Benoit; Moirez, Jacques; Saint-Sevin, Michel; Blot, Michel; and Baluteau, Jean-Michel, 4,487,503, Cl. 356-136.000.
Saito, Hiroshi: *See*—
Shiotsubo, Masami; Yamamuro, Toshikazu; and Saito, Hiroshi, 4,487,525, Cl. 405-184.000.
Saito, Takashi; Uchida, Masayoshi; Mochizuki, Masafumi; and Arai, Norimasa, to Victor Company of Japan, Ltd. Signal-pickup cartridge for a rotary recording medium reproducing apparatus. 4,488,286, Cl. 369-292.000.
Saito, Toshio: *See*—
Sakuta, Masaharu; Kiya, Soichi; Uchizaki, Iwao; Yoshioka, Yasuhiko; Ito, Koichi; Saito, Toshio; Kaya, Tadahiro; Shioya, Tsunetoshi; and Shimoyama, Yoshifumi, 4,487,633, Cl. 106-90.000.
Saitou, Sinichi, to Olympus Optical Co., Ltd. Plate rocking-coupling apparatus. 4,488,197, Cl. 360-137.000.
Sakai, Katsuhide, to Carl Freudenberg, Firma. Fusion bonding interlining strip. 4,486,902, Cl. 2-97.000.
Sakai, Kiyoshi: *See*—
Katagiri, Kazuharu; Watanabe, Katsunori; Sakai, Kiyoshi; Ishikawa, Shozo; and Kitahara, Makoto, 4,487,824, Cl. 430-58.000.
Sakai, Shuzo: *See*—
Miyake, Toshio; Sakai, Shuzo; and Shibuya, Takashi, 4,487,198, Cl. 127-46.300.
Sakaino, Keiju: *See*—
Ohinata, Okinobu; Hirahara, Takuho; Sakaino, Keiju; Uzawa, Yawara; Shimizu, Nobuhiro; and Shida, Shigeru, 4,487,555, Cl. 417-312.000.
Sakakima, Hiroshi: *See*—
Yanagiuchi, Yukihiro; Hirota, Eiichi; Sakakima, Hiroshi; and Senno, Harufumi, 4,488,195, Cl. 360-125.000.
Sakamoto, Sadayuki: *See*—
Fukuda, Tadanori; and Sakamoto, Sadayuki, 4,487,904, Cl. 526-301.000.
Sakao, Nobuo; and Kuraoka, Yasuo, to Hoxan Corporation. Method of freezing fertilized ova, spermatozoa or the like and apparatus therefor. 4,487,033, Cl. 62-373.000.
Sakata, Hideo, to Mitutoyo Mfg. Co., Ltd. Touch signal probe. 4,488,019, Cl. 200-61.420.
Sakito, Yoji: *See*—
Suzukamo, Gohfu; and Sakito, Yoji, 4,487,956, Cl. 560-124.000.
Sakuta, Masaharu; Kiya, Soichi; Uchizaki, Iwao; Yoshioka, Yasuhiko; Ito, Koichi; Saito, Toshio; Kaya, Tadahiro; Shioya, Tsunetoshi; and Shimoyama, Yoshifumi, to Takenaka Komuten Co., Ltd.; Takenaka Doboku Co., Ltd.; and Sankyo Chemical Industries Ltd. Water-inseparable concrete composition. 4,487,633, Cl. 106-90.000.
Sallustio, Joseph: *See*—
Vuckovich, Michael; Burkett, John P.; and Sallustio, Joseph, 4,487,741, Cl. 376-271.000.
Salmon, Jean P., to Jeumont-Schneider. Method of controlling a railroad car in automatic drive. 4,487,385, Cl. 246-122.00R.
Salmon, Jean P.; and Laurent, Daniel M., to Jeumont-Schneider Corporation. Selection stage of the AC signal of greater amplitude between two signals of different frequencies. 4,488,238, Cl. 364-483.000.
Salomon, Georges P. J., to S.A. Etablissements Francois Salomon & Fils. System for binding a boot to a ski. 4,487,427, Cl. 280-615.000.

Sams, H. Wayne; and Campitello, Nicholas, to Carrier Corporation. Electronic switch control method. 4,488,102, Cl. 318-810.000.

Samsung Semiconductor & Telecommunications Company, Ltd.: *See*—
Min, Sung K.; Lee, Bang W.; and Choi, Doo H., 4,488,094, Cl. 318-16.000.

Samuelsson, Bengt A. Weed-killing assembly. 4,486,976, Cl. 47-1.500.

Sandberg, Karen R.: *See*—
Turbak, Albin F.; Snyder, Fred W.; and Sandberg, Karen R., 4,487,634, Cl. 106-203.000.

Sanden Corporation: *See*—
Fukushima, Eiji; Fukuhara, Seiichi; and Hiraga, Masaharu, 4,487,248, Cl. 164-131.000.

Sanderson, John R., to Texaco Inc. Oxidation of cyclohexylbenzene to 1-phenyl cyclohexylhydroperoxide. 4,487,974, Cl. 568-570.000.

Sanderson, Robert C., to Better Wire Products, Inc. Stacking wire for produce trays. 4,487,317, Cl. 206-509.000.

Sankyo Chemical Industries Ltd.: *See*—
Sakuta, Masaharu; Kiya, Soichi; Uchizaki, Iwao; Yoshioka, Yasuhiko; Ito, Koichi; Saito, Toshio; Kaya, Tadahiro; Shioya, Tsunetoshi; and Shimoyama, Yoshifumi, 4,487,633, Cl. 106-90.000.

Sankyo Company Limited: *See*—
Morisawa, Yasuhiro; Konishi, Kiyoshi; and Kataoka, Mitsuru, 4,487,781, Cl. 424-301.000.

Sano, Kenji: *See*—
Matsuoka, Naoki; Matsumoto, Hiroshi; Hori, Yutaka; Miki, Yoshio; Sano, Kenji; and Ijichi, Ichiro, 4,487,897, Cl. 526-64.000.

Sanofi: *See*—
Chekroun, Isaac; and Heymes, Alain, 4,487,931, Cl. 546-280.000.

Sanshin Electric Co., Ltd.: *See*—
Miyata, Hiroyasu; Watanabe, Keizo; and Yamaguchi, Akio, 4,487,084, Cl. 74-10.330.

Sansoucy, David E., to Polymer Machinery Corporation. Metal detector device for auger feed granulators. 4,487,310, Cl. 198-524.000.

Santrade Ltd.: *See*—
Wermeister, Gunter, 4,487,533, Cl. 407-105.000.

Sanyo Electric Co., Ltd.: *See*—
Shono, Masahiro, 4,488,210, Cl. 363-19.000.

Sapru, Krishna: *See*—
Ovshinsky, Stanford R.; Sapru, Krishna; and Reger, Arie, 4,487,818, Cl. 429-44.000.

Sarantakis, Dimitrios, to American Home Products Corporation. N-(1-Carboxy-3-phenylpropyl)-dipeptides. 4,487,716, Cl. 260-112.50R.

Saringer, John H., to Imasco-CDC Research Foundation. Device for imparting continuous passive motion to human joints. 4,487,199, Cl. 128-25.00R.

Sarkozi, Miklos: *See*—
Gyugyi, Laszlo; and Sarkozi, Miklos, 4,488,216, Cl. 363-160.000.

Sartori, Guido: *See*—
Stogryn, Eugene L.; Ho, W. S. Winston; Montagna, Angelo A.; and Sartori, Guido, 4,487,967, Cl. 564-474.000.

Sartorius GmbH: *See*—
Knothe, Erich; Melcher, Franz-Josef; Oldendorf, Christian; and Ober, Jurgen, 4,487,280, Cl. 177-212.000.

Sasaki, Shigeru: *See*—
Mori, Hidetomo; Suzuki, Akira; Uchida, Riichi; and Sasaki, Shigeru, 4,487,563, Cl. 418-201.000.

Sassak, Frank, to McInerney Spring & Wire Co. Single eye clamp. 4,486,924, Cl. 24-277.000.

Sassak, John J. Fluid suspended passenger carrying spherical body having universal attitude control. 4,487,410, Cl. 272-6.000.

Sato, Masamichi; Arai, Noboru; Sunaga, Yasumasa; and Inuiya, Masafumi, to Fuji Photo Film Co., Ltd.; and Fuji Photo Optical Co., Ltd. Imaging system having vari-focal lens for use in endoscope. 4,488,039, Cl. 250-216.000.

Sato, Takashi: *See*—
Kawasaki, Hironobu; Sato, Takashi; Hayashi, Tomohiko; and Ozawa, Tsutomu, 4,487,812, Cl. 428-629.000.

Sato, Yasuyuki: *See*—
Kondo, Ryoji; Higuchi, Kanji; Takamura, Kozo; Sato, Yasuyuki; and Nagai, Minoru, 4,488,081, Cl. 313-141.000.

Sato, Yukio: *See*—
Tanaka, Masaaki; Sato, Yukio; Hishii, Masao; and Nagai, Haruhiko, 4,488,309, Cl. 372-87.000.

Satz, Richard: *See*—
Chernotsky, Alan; and Satz, Richard, 4,488,106, Cl. 323-239.000.

Savio & C. S.p.A.: *See*—
Cassinelli, Giuseppe, 4,487,546, Cl. 414-751.000.

Sawamura, Kentaro, to TDK Corporation. Method for the preparation of a high density sintered body of silicon carbide. 4,487,734, Cl. 264-61.000.

Saxman, John H.: *See*—
Axmear, Frederick E.; Baxter, Duane W.; Saxman, John H.; and Siverling, Michael M., 4,488,189, Cl. 360-78.000.

Scag, Dane T. Lawn mower. 4,487,006, Cl. 56-14.700.

Schafer, Thomas: *See*—
Kruger, H. Eckhard; Freienstein, Bernd; and Schafer, Thomas, 4,488,179, Cl. 358-181.000.

Schaller, Klaus: *See*—
Elbe, Hans-Ludwig; Jautelat, Manfred; Buchel, Karl H.; Schaller, Klaus; and Plempel, Manfred, 4,487,776, Cl. 424-269.000.

Schamberg, Eckehard: *See*—
Koerner, Gotz; Priesch, Manfred; Rau, Harald; and Schamberg, Eckehard, 4,487,809, Cl. 428-447.000.

Schaper, Hermann, to Rheinmetall GmbH. Safety fuse with automatic underwater self-disarming. 4,487,126, Cl. 102-229.000.

Scheie, Carl E.; and Knoebel, Howard, to Brunswick Corporation. Method and apparatus for transferring the profile of conditioning material on a bowling lane surface. 4,487,788, Cl. 427-9.000.

Scheinberg, Israel H. Method of treatment of rheumatoid arthritis. 4,487,780, Cl. 424-294.000.

Schell, Barry E.: *See*—
Bahr, Gunter F.; and Schell, Barry E., 4,488,043, Cl. 250-311.000.

Schepers, Bernhard: *See*—
Mizrah, Tiberiu; Schepers, Bernhard; and Schroder, Bernd, 4,487,756, Cl. 423-625.000.

Schering Aktiengesellschaft: *See*—
Skuballa, Werner; Raduechel, Bernd; Schwarz, Norbert; Vorbrueggen, Helmut; and Elger, Walter, 4,487,953, Cl. 560-55.000.

Schiele, August; and Janda, Helmut, to Keller & Knappich Wehrtechnik GmbH, Firma. Container for the pickup and feed of a cartridge. 4,487,104, Cl. 89-34.000.

Schilling, Walter: *See*—
Zweifel, Hans; Schilling, Walter; Storni, Angelo; and Bellus, Daniel, 4,487,942, Cl. 549-236.000.

Schlageter, Bernhard: *See*—
Baier, Erich; Koefferlein, Rainer; and Schlageter, Bernhard, 4,487,496, Cl. 355-3.0DD.

Schlodder, Rainer: *See*—
Dorbath, Bernd; Schlodder, Rainer; and Giesecke, Norbert, 4,487,664, Cl. 204-44.300.

Schlumberger Canada Limited: *See*—
Arnason, John D.; and Hampton, Michael J., 4,488,152, Cl. 340-870.370.

Schlusnus, Karl-Heinz: *See*—
Gerling, Erich; Schlusnus, Karl-Heinz; and Wahl, Hans-Jurgen, 4,487,070, Cl. 73-609.000.

Schmid, Wolfgang: *See*—
Bleicher, Manfred; Schmid, Wolfgang; and Wanner, Karl, 4,487,272, Cl. 173-48.000.

Schmidt, Edgar: *See*—
Rodi, Anton; Schmidt, Edgar; and Uhrig, Dieter, 4,488,107, Cl. 323-340.000.

Schmidt, Ernst R.: *See*—
Carter, Randy E.; and Schmidt, Ernst R., 4,487,030, Cl. 62-141.000.

Schmidt, Karl, to Hydrometer GmbH. Reversing valve for combination meter. 4,487,217, Cl. 137-110.000.

Schmidt, Peter: *See*—
Wahl, Josef; and Schmidt, Peter, 4,487,186, Cl. 123-436.000.

Schmitt, Kirk D., to Mobil Oil Corporation. Substituted heterocyclic methane sulfonates as sacrificial agents in enhanced oil recovery. 4,487,702, Cl. 252-8.55D.

Schmitt, Kirk D., to Mobil Oil Corporation. Radiation method for determining brine tolerant surfactants in complex mixtures. 4,487,837, Cl. 436-27.000.

Schmitz, Karl-Heinz; and Steinberger, Josef, to Paul Forkardt GmbH & Co. KG. Clamping-force transducer for rotating clamping devices. 4,487,078, Cl. 73-862.060.

Schmukler, Seymour: *See*—
Adur, Ashok M.; Schmukler, Seymour; Machonis, John, Jr.; and Shida, Mitsuzo, 4,487,885, Cl. 525-74.000.

Schneider, Rudolf: *See*—
Liechti, Niklaus; and Schneider, Rudolf, 4,488,029, Cl. 219-69.00C.

Schoenke, Ronald O., to Johnson Service Company. Double pivoting hinge having interchangeable brackets. 4,486,919, Cl. 16-366.000.

Scholl, Karl H.: *See*—
Hagen, Karl; and Scholl, Karl H., 4,487,728, Cl. 264-23.000.

Scholl, Margarete: *See*—
Noetzel, Siegfried; Scholl, Margarete; and Ballreich, Heinz, 4,487,655, Cl. 162-5.000.

Scholten, Heinz: *See*—
Feldmann, Rainer; and Scholten, Heinz, 4,487,895, Cl. 525-432.000.

Schonmeier, Herbert, to Jagenberg AG. Method and apparatus for lowering web rolls in winding machines. 4,487,545, Cl. 414-684.000.

Schreiner, Peter J.; and Gumkowski, Bert A., to Bendix Corporation, The. Wire spring for a disc brake. 4,487,296, Cl. 188-73.380.

Schroder, Bernd: *See*—
Mizrah, Tiberiu; Schepers, Bernhard; and Schroder, Bernd, 4,487,756, Cl. 423-625.000.

Schroder, Gerhard, to Dr. Ing. h.c.F. Porsche AG. Convertible top for passenger motor vehicles. 4,487,447, Cl. 296-108.000.

Schroeder, Warren C. Support bed. 4,486,908, Cl. 5-60.000.

Schubert, Bernhard: *See*—
Tolasch, Gerhard; Schubert, Bernhard; and Menge, Gunter, 4,487,001, Cl. 53-151.000.

Schulte-Elte, Karl-Heinrich; and Muller, Bernard, to Firmenich, SA. Acetylenic and allenic carbinols, their utilization as starting materials for the preparation of β-damascenone and process for preparing same. 4,487,944, Cl. 549-416.000.

Schulz, Volkmar: *See*—
Rampel, Hans; Dinkel, Emil; and Schulz, Volkmar, 4,487,391, Cl. 248-429.000.

Schurter, Rolf: *See*—
Fory, Werner; Gass, Karl; Meyer, Willy; and Schurter, Rolf, 4,487,951, Cl. 560-12.000.

Schwartz, Charles A. Transformer for welding gun. 4,488,135, Cl. 336-62.000.

Schwartz, Martin A.: *See*—
Hynes, Richard O.; and Schwartz, Martin A., 4,487,838, Cl. 436-504.000.

Schwarz, Frederick M.; and Griffin, James G., to United Technologies Corporation. Modulated clearance control for an axial flow rotary machine. 4,487,016, Cl. 60-204.000.

Schwarz, Norbert: *See*—
Skuballa, Werner; Raduechel, Bernd; Schwarz, Norbert; Vorbrueggen, Helmut; and Elger, Walter, 4,487,953, Cl. 560-55.000.

Schwarzmann, Matthias: *See*—
Krabetz, Richard; Merger, Franz; and Schwarzmann, Matthias, 4,487,962, Cl. 562-534.000.

SCM Corporation: *See*—
Craun, Gary P., 4,487,889, Cl. 525-163.000.
Martino, Phillip C., 4,487,859, Cl. 523-406.000.
Winner, Peter P.; and Woo, James T. K., 4,487,860, Cl. 523-408.000.
Winner, Peter P., 4,487,861, Cl. 523-428.000.

Scott, Edith: *See*—
Almond, Stephen W.; and Scott, Edith, 4,487,866, Cl. 524-42.000.
Almond, Stephen W.; and Scott, Edith, 4,487,867, Cl. 524-42.000.

Scott, Waller M., Jr., to Scovill Inc. Musical door chime preferably also combined with a clock for annunciating the time. 4,488,272, Cl. 368-75.000.

Scott, William B.; Dickinson, Daniel C.; and Arnesson, Joel C. E., to W. A. Whitney Corp. Punch press with automatic tool changer. 4,486,941, Cl. 29-568.000.

Scovill Inc.: *See*—
Butts, Lawrence D., 4,488,036, Cl. 235-482.000.
Scott, Waller M., Jr., 4,488,272, Cl. 368-75.000.

Scrub-Tek, Inc.: *See*—
Grossman, Bruce M., 4,487,616, Cl. 55-85.000.

Scruggs, Major B.; and Fay, Robert C., to Milliken Research Corporation. Carpet cutting device. 4,486,926, Cl. 26-13.000.

Seaquist Closures, a Division of Pittway Corporation: *See*—
Ostrowsky, Efrem M., 4,487,324, Cl. 215-253.000.

SEB S.A.: *See*—
Routhier, Dominique, 4,487,116, Cl. 99-339.000.

SEDCO, Inc.: *See*—
Shanks, Forrest E., 4,487,150, Cl. 114-264.000.

Seehase, Jack C. Safety device for firearms. 4,486,966, Cl. 42-1.00N.

Seemann, Howard H.: *See*—
Gottschlich, Chad F.; Roblee, Leland H. S., Jr.; Seemann, Howard H.; Bates, William G.; and Spahr, Richard F., 4,487,573, Cl. 431-348.000.

Segawa, Keiji: *See*—
Takehara, Hideaki; Wada, Yoshiyo; Goto, Kunio; and Segawa, Keiji, 4,488,281, Cl. 369-126.000.

Seibel, Richard R., to AT&T Bell Laboratories. Line control of switched network data sets. 4,488,002, Cl. 179-2.0DP.

Seid, Gordon: *See*—
Cronin, Michael J.; and Seid, Gordon, 4,487,034, Cl. 62-402.000.

Sekmakas, Kazys; and Shah, Raj, to DeSoto, Inc. Wet adhesion promoters for emulsion polymers. 4,487,940, Cl. 548-320.000.

Sekmakas, Kazys; and Shah, Raj, to DeSoto, Inc. Wet adhesion promoters for emulsion polymers. 4,487,941, Cl. 548-320.000.

Selas Corporation of America: *See*—
Gottschlich, Chad F.; Roblee, Leland H. S., Jr.; Seemann, Howard H.; Bates, William G.; and Spahr, Richard F., 4,487,573, Cl. 431-348.000.

Sellmaier, Franz: *See*—
Boning, Bernward; Bone, Rainer; Nagel, Rudolf; and Sellmaier, Franz, 4,487,184, Cl. 123-425.000.

Sellstrom, Kathy B., to Texaco Inc. Decorative epoxy resin aggregate binder formulation. 4,487,805, Cl. 428-413.000.

Sellstrom, Kathy B.; and Waddill, Harold G., to Texaco Inc. Decorative epoxy resin aggregate binder formulation. 4,487,806, Cl. 428-413.000.

Selman, Charles M.: *See*—
Parlman, Robert M.; and Selman, Charles M., 4,487,844, Cl. 502-104.000.

Semeghini, Gian L.; Ferrari, Roberto; Rizzotto, Vittorino; Omacini, Alberto; and Rossi, Carlo, to Vitrofil S.p.A.; and Montepolimeri S.p.A. Process and device for the continuous production of glass fiber reinforced sheets of thermoplastic polymers. 4,487,647, Cl. 156-181.000.

Senco Products, Inc.: *See*—
Rothfuss, Robert G.; and Kuhl, David K., 4,487,394, Cl. 254-28.000.

Senno, Harufumi: *See*—
Yanagiuchi, Yukihiro; Hirota, Eiichi; Sakakima, Hiroshi; and Senno, Harufumi, 4,488,195, Cl. 360-125.000.

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Lehmann, Werner K.; Lamey, Robert E.; and Lehmann, Karl, 4,487,045, Cl. 72-43.000.

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Shutske, Gregory M.; and Setescak, Linda L., 4,487,934, Cl. 546-314.000.

Shaffer, Frank E. Adjustable metering oil pump. 4,487,340, Cl. 222-385.000.

Shaffer, John H.: *See*—
Foster, Craig A.; and Shaffer, John H., 4,487,751, Cl. 423-474.000.

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Shanks, Forrest E., to SEDCO, Inc. Riser recoil preventer system. 4,487,150, Cl. 114-264.000.

Sharp Corporation: *See*—
Kanatani, Yoshiharu, 4,488,150, Cl. 340-781.000.

Sharp Kabushiki Kaisha: *See*—
Nonomura, Keisaku; Takamatsu, Toshiaki; Uede, Hisashi; and Wada, Tomio, 4,487,480, Cl. 350-335.000.
Shota, Minoru, 4,488,089, Cl. 315-106.000.
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Waldo, David T.; Peterson, James L.; and Grimes, William D., 4,487,228, Cl. 138-96.00T.

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Buurman, Cornelis; and Plaschkes, Arnon, 4,487,510, Cl. 366-337.000.
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Sherman, Henry, to In-Electronic. Compact telephone unit with a plug-in module. 4,488,009, Cl. 179-100.00D.

Shibamoto, Takeshi: *See*—
Takahashi, Nobuaki; Takashima, Seiichi; Shibamoto, Takeshi; Suzuki, Fujio; and Tanaka, Kohji, 4,488,182, Cl. 358-310.000.

Shibata, Kiyoshi: *See*—
Kimura, Hiroshi; Hisajima, Masahiko; Morimoto, Kiyoshi; Shibata, Kiyoshi; Nagashima, Takashi; Yoshikawa, Yasuhiko; Watashi, Masahiro; Yamamoto, Kiyonori; Yamamoto, Toshihiko; and Yoshinaga, Shinsuke, 4,487,497, Cl. 355-8.000.

Shibuya, Masanori: *See*—
Wakatsuki, Goroei; Ohzono, Kohei; and Shibuya, Masanori, 4,487,282, Cl. 180-210.000.

Shibuya, Takashi: *See*—
Miyake, Toshio; Sakai, Shuzo; and Shibuya, Takashi, 4,487,198, Cl. 127-46.300.

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Adur, Ashok M.; Schmukler, Seymour; Machonis, John, Jr.; and Shida, Mitsuzo, 4,487,885, Cl. 525-74.000.

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Shier, John S.: *See*—
Jopke, Walter H., Jr.; and Shier, John S., 4,486,946, Cl. 29-590.000.

Shih, Yen-Jer; El-Aasser, Mohamed S.; and Vanderhoff, John W. Colored latexes; methods for making same and colored finely divided products. 4,487,855, Cl. 523-201.000.

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Shimadzu Corporation: *See*—
Komoto, Akira, 4,487,279, Cl. 177-212.000.

Shimizu, Atsushi; and Yamataka, Kazunori, to Asahi Kasei Kogyo Kabushiki Kaisha. Method for producing iodine or iodine derivatives. 4,487,752, Cl. 423-507.000.

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Shimizu, Hirokazu: *See*—
Sugino, Takashi; Itoh, Kunio; Wada, Masaru; Shimizu, Hirokazu; Mizuno, Hiroyuki; and Fujimoto, Kazuo, 4,488,306, Cl. 372-46.000.

Shimizu, Isamu: *See*—
Inoue, Eiichi; and Shimizu, Isamu, 4,488,083, Cl. 313-366.000.

Shimizu, Kiichi: *See*—
Mochida, Haruo; Takeda, Yoshimitsu; Fukasawa, Takeshi; Masaki, Mikio; Shimizu, Kiichi; and Kobayashi, Satoru, 4,487,042, Cl. 70-186.000.

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Shimonou, Shigeru, to Nippon Electric Co., Ltd. Position control system for a movable member. 4,488,098, Cl. 318-561.000.

Shimosaka, Satoru: *See*—
Koike, Masaru; Hasegawa, Yasumasa; Shimosaka, Satoru; Aoyama, Nagara; and Yoshizumi, Toshihiko, 4,486,963, Cl. 34-116.000.

Shimoyama, Yoshifumi: *See*—
Sakuta, Masaharu; Kiya, Soichi; Uchizaki, Iwao; Yoshioka, Yasuhiko; Ito, Koichi; Saito, Toshio; Kaya, Tadahiro; Shioya, Tsunetoshi; and Shimoyama, Yoshifumi, 4,487,633, Cl. 106-90.000.

Shimp, David A.; and Graver, Richard B., to Celanese Corporation. Polyglycidyl hindered aromatic amines. 4,487,948, Cl. 549-552.000.

Shin-Etsu Chemical Co., Ltd.: *See*—
Ueno, Susumu; and Kamata, Hideaki, 4,487,880, Cl. 524-495.000.

Shinohara, Kazuo; and Shoji, Yoshihiro, to Toso Kabushiki Kaisha. Torque-adjusting device for use in a roller blind. 4,487,245, Cl. 160-313.000.

Shiotsubo, Masami; Yamamuro, Toshikazu; and Saito, Hiroshi, to Kabushiki Kaisha Komatsu Seisakusho. Propulsion pipe laying system. 4,487,525, Cl. 405-184.000.

Shioya, Tsunetoshi: *See*—
Sakuta, Masaharu; Kiya, Soichi; Uchizaki, Iwao; Yoshioka, Yasuhiko; Ito, Koichi; Saito, Toshio; Kaya, Tadahiro; Shioya, Tsunetoshi; and Shimoyama, Yoshifumi, 4,487,633, Cl. 106-90.000.

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Shirai, AKira: *See*—
Arakawa, Susumu; Tsukigahora, Tooru; and Shirai, AKira, 4,487,021, Cl. 60-534.000.

Shirakawa, Hideki: *See*—
Kobayashi, Yukio; Shirakawa, Hideki; and Ikeda, Sakuji, 4,487,709, Cl. 252-500.000.

Shirey, Thomas F.; Servias, William C.; and Young, Curtis H., Jr., to Electro-Sensor, Inc. Voltage monitor with visible level indicator. 4,488,110, Cl. 324-133.000.

Shoji, Masakazu, to AT&T Bell Laboratories. Databus coupling arrangement using transistors of complementary conductivity type. 4,488,066, Cl. 307-452.000.

Shoji, Yoshihiro: *See*—
Shinohara, Kazuo; and Shoji, Yoshihiro, 4,487,245, Cl. 160-313.000.

Shono, Masahiro, to Sanyo Electric Co., Ltd. Power supply circuit of switching regulator type. 4,488,210, Cl. 363-19.000.

Shono, Masaru; Kawakami, Takahiro; Matsumoto, Toshiyuki; Tamura, Thoru; and Matsumoto, Hideki, to Fudo Construction Co., Ltd. Method and apparatus of forming sand piles for improving a soft ground. 4,487,524, Cl. 405-50.000.

Shota, Minoru, to Sharp Kabushiki Kaisha. Fluorescent indicator tube driving circuit. 4,488,089, Cl. 315-106.000.

Show-Pak, Incorporated: *See*—
Wilcox, Donald G.; and Zambrano, Nobile, 4,487,328, Cl. 220-241.000.

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Kobayashi, Yukio; Shirakawa, Hideki; and Ikeda, Sakuji, 4,487,709, Cl. 252-500.000.

Shtepa, Evgeny D.: *See*—
Antonov, Veniamin V.; Bat, Jury I.; Gamalei, Edvin I.; Dolzhenkov, Fedor E.; Donskoi, Semen A.; Kulichenko, Valentin A.; Tischenko, Oleg I.; Shtepa, Evgeny D.; and Chervonenko, Viktor M., 4,487,397, Cl. 266-44.000.

Shu, Winston R.: *See*—
Venkatesan, V. N.; and Shu, Winston R., 4,487,262, Cl. 166-271.000.

Shutske, Gregory M.; and Setescak, Linda L., to Hoechst-Roussel Pharmaceuticals Inc. Method of preparing poly-substituted acylbenzenes. 4,487,934, Cl. 546-314.000.

Shy, Min C. Pushbutton type bottle cap. 4,487,342, Cl. 222-481.500.

Sick, Peter; and Menini, Joseph. Apparatus for combining first and second liquids in a vessel to achieve a precise dosage of the second liquid and a precise final height of the combined liquids. 4,487,237, Cl. 141-39.000.

Siddall, Mark B., to Teledyne Industries, Inc. Zirconium isotope separation. 4,487,629, Cl. 75-84.400.

Siecor Corporation: *See*—
Dellinger, Thomas A.; and Hampton, Clifton G., 4,488,008, Cl. 179-81.00R.

Siemens Aktiengesellschaft: *See*—
Baier, Erich; Koefferlein, Rainer; and Schlageter, Bernhard, 4,487,496, Cl. 355-3.0DD.
Lange, Hans A., 4,488,153, Cl. 343-6.5SS.
Pfaff, Gerhard; and Wick, Albert, 4,488,215, Cl. 363-159.000.
Troost, Marcel A., 4,488,292, Cl. 370-63.000.
Welzhofer, Klaus, 4,488,062, Cl. 307-268.000.

Siemens-Allis, Inc.: *See*—
McClellan, David P.; Duble, Gerald R.; and Hofferberth, William H., 4,488,133, Cl. 335-16.000.

Sierra Instruments, Inc.: *See*—
Olin, John G.; and Korpi, David M., 4,487,062, Cl. 73-202.000.

Sifri, Elie C., to Cascade Corporation. Line take-up assembly for a lift truck. 4,487,218, Cl. 137-355.260.

Sigma Instruments Inc.: *See*—
Field, John H., II, 4,488,069, Cl. 310-49.00A.

Signet Scientific Co.: *See*—
Pounder, Edwin; Arena, Alan J.; Pawlowski, Michael; and Totten, Adrian M., 4,487,333, Cl. 222-54.000.

Signorile, Eugene R., to Telecopt Co. Battery jumper cable system. 4,488,147, Cl. 340-636.000.

Silver, Theodore R.: *See*—
Ruyak, Robert F.; Silver, Theodore R.; and Tomasino, Rocco J., 4,487,557, Cl. 417-420.000.

Silvers, Richard A.; English, Joseph; and English, Lester. Aero circulator stove. 4,487,194, Cl. 126-67.000.

Simko, Richard T., to Xicor, Inc. High voltage ramp rate control systems. 4,488,060, Cl. 307-263.000.

Simms, Gordon R.; Allison, Philip J.; and Benson, Cameron R., to T. S. Simms & Co. Limited. Apparatus for forming paint brush heads. 4,487,565, Cl. 425-115.000.

Simo, Thomas; and Eisenlohr, Karl-Heinz, to Metallgesellschaft AG. Method of processing heavy hydrocarbon oils. 4,487,687, Cl. 208-56.000.

Simon, Joseph A. Method for forming well drill tubing. 4,487,357, Cl. 228-173.00F.

Simons, Clay G. Method for forming a hand-hewn look on a laminate. 4,487,736, Cl. 264-295.000.

Simonson, John L.: *See*—
Marinak, Michael J.; and Simonson, John L., 4,487,935, Cl. 546-345.000.

Simpson, John H.: *See*—
Chiappetta, Ferdinand; Simpson, John H.; and Simpson, Neville H., 4,487,010, Cl. 57-213.000.

Simpson, Neville H.: *See*—
Chiappetta, Ferdinand; Simpson, John H.; and Simpson, Neville H., 4,487,010, Cl. 57-213.000.

Sindelar, William F. Homokinetic universal joint. 4,487,594, Cl. 464-123.000.

Singer, Arthur L.: *See*—
Ippolito, Stephen J.; Singer, Arthur L.; and Lambert, William J., 4,488,224, Cl. 364-200.000.

Singer Company, The: *See*—
Hicks, Irwin A., 4,487,064, Cl. 73-253.000.
Horey, Leonard I.; and Kurland, Marvin, 4,488,300, Cl. 371-21.000.
Rodda, Donald; and Odermann, Charles R., 4,487,142, Cl. 112-168.000.
Valori, Giuseppe; Primati, Marco; and Stevens, Victor G., 4,486,940, Cl. 29-509.000.
Weisz, William, 4,487,141, Cl. 112-158.00C.

Siverling, Michael M.: *See*—
Axmear, Frederick E.; Baxter, Duane W.; Saxman, John H.; and Siverling, Michael M., 4,488,189, Cl. 360-78.000.

SKF Steel Engineering Aktiebolag: *See*—
Bjorling, Gotthard, 4,487,628, Cl. 75-10.00R.

Skogberg, Bo T., to Atlas Copco Aktibolag. Earth anchoring expansion body having folded sheet metal casing. 4,487,528, Cl. 405-259.000.

Skuballa, Werner; Raduechel, Bernd; Schwarz, Norbert; Vorbrueggen, Helmut; and Elger, Walter, to Schering Aktiengesellschaft. 9-Bromoprostaglandins, their preparation, and their use as medicaments. 4,487,953, Cl. 560-55.000.

SKW Trostberg: *See*—
Rieder, Georg L., 4,487,625, Cl. 71-77.000.

Slattery, Sidney E.; Henshaw, Harry; and Havercroft, Peter, to Rolls-Royce Limited. Mounting arrangements for combustion equipment. 4,487,015, Cl. 60-39.320.

Slezak, Paul J.; Durand, Marcel J. P. E.; and Dunlop, Robert P., to KHD-Canada, Inc. Electronic control unit for internal combustion engines. 4,487,169, Cl. 123-41.330.

Sloan, Frederick R. W., to Listrend Limited. Dyeing of fibrous materials. 4,487,608, Cl. 8-493.000.

Small World Toys: *See*—
Goldwasser, Edward M., 4,487,585, Cl. 434-259.000.

Smith, Darrell F., Jr.: *See*—
Smith, John S.; and Smith, Darrell F., Jr., 4,487,743, Cl. 420-459.000.

Smith, Franklin G.; and Prevost, David L., to Hsagen, LeRoy G. Let down apparatus. 4,487,292, Cl. 182-234.000.

Smith, John S.; and Smith, Darrell F., Jr., to Huntington Alloys, Inc. Controlled expansion alloy. 4,487,743, Cl. 420-459.000.

Smith, Paul T.: *See*—
Miscioscio, Kathleen B.; and Smith, Paul T., 4,487,665, Cl. 204-47.000.

Smith, Roger D.: *See*—
Wiatt, James G.; Calvert, James W.; Belcher, Samuel L.; and Smith, Roger D., 4,487,568, Cl. 425-534.000.

Smith, Stuart B., to Thermocell Development, Ltd. Sprayable, modified polyisocyanurate composition and articles therefrom. 4,487,816, Cl. 428-423.300.

Smolyanitsky, Boris N.; Boginsky, Vladimir P.; Gileta, Vladimir P.; Syryamin, Jury N.; and Terskov, Alexei D., to Institut Gornogo Dela. Gripping tool adapted for use with device for driving rod-shaped elements into and out of the ground. 4,487,273, Cl. 173-55.000.

Sneider, Vincent R. Syringe closure assembly with attachable nozzle. 4,487,336, Cl. 222-107.000.

Snider, Hugh H., Jr., to United States of America, Navy. Electrical connector. 4,488,139, Cl. 339-143.00R.

Snyder, Fred W.: *See*—
Turbak, Albin F.; Snyder, Fred W.; and Sandberg, Karen R., 4,487,634, Cl. 106-203.000.

Socapex: *See*—
Guerrero, Michel; and Doret, Didier, 4,487,467, Cl. 339-49.00R.

Societe Anonyme de Telecommunications: *See*—
Baudot, Jean-Jacques, 4,488,041, Cl. 250-231.0GY.

Societe Anonyme dite: Arjomari-Prioux: *See*—
Gomez, Daniel, 4,487,657, Cl. 162-158.000.

S.A. Etablisaements Francois Salomon & Fils: *See*—
Salomon, Georges P. J., 4,487,427, Cl. 280-615.000.
Societe de Paris et du Rhone: *See*—
Papazian, Samuel, 4,488,105, Cl. 320-64.000.
Societe de Vente de L'Aluminum Pechiney: *See*—
Vives, Charles, 4,487,401, Cl. 266-234.000.
Societe Industrielle D'Appareils Automatiques: *See*—
DeJardins, Andre P., 4,487,337, Cl. 222-129.300.
Societe Nationale de L'Amiante: *See*—
Lalancette, Jean M.; and Ostiguy, Claude, 4,487,624, Cl. 71-32.000.
Societe Nationale des Poudres et Explosifs: *See*—
Boileau, Jacques; Emeury, Jean-Marie L.; and Kehren, Jean-Paul, 4,487,938, Cl. 548-304.000.
Societe Nationale Industrielle Aerospatiale: *See*—
Larribe, Andre P., 4,487,730, Cl. 264-40.100.
Societe pour l'Etude et la Fabrication des Circuits Integres Speciaux: *See*—
Brice, Jean M., 4,488,246, Cl. 364-716.000.
Solarcrete Corporation: *See*—
Graham, Douglas L.; and Graham, Mark L., 4,486,993, Cl. 52-262.000.
Sommerfeld, Eugene G.: *See*—
Coughlin, James E.; Sommerfeld, Eugene G.; and Strolle, Clifford H., 4,487,909, Cl. 528-60.000.
Sony Corporation: *See*—
Furukawa, Shunsuke; and Yamamoto, Kenji, 4,488,225, Cl. 364-200.000.
Nakamura, Takashi; Morioka, Yoshihiro; and Sugimoto, Hiroyuki, 4,488,085, Cl. 315-3.000.
Otobe, Takashi; Komatsu, Yasutoshi; and Murakami, Yoshikazu, 4,488,109, Cl. 324-83.00R.
Yamamoto, Kaichi, 4,488,169, Cl. 358-22.000.
Sopelem: *See*—
Grandjacques, Benoit; Moirez, Jacques; Saint-Sevin, Michel; Blot, Michel; and Baluteau, Jean-Michel, 4,487,503, Cl. 356-136.000.
Spahr, Richard F.: *See*—
Gottschlich, Chad F.; Roblee, Leland H. S., Jr.; Seemann, Howard H.; Bates, William G.; and Spahr, Richard F., 4,487,573, Cl. 431-348.000.
Spatz, David M., to Chevron Research Company. N-Phenyl-2-thiomethylsuccinimides, and N-phenyl-2-thiomethenyl succinimides, and fungicidal use thereof. 4,487,777, Cl. 424-274.000.
Specht, Herbert: *See*—
Jager, Gernot; Spitz, Hubert; and Specht, Herbert, 4,487,575, Cl. 432-1.000.
Speicher, Paul L. Seed and fertilizer spreader. 4,487,370, Cl. 239-687.000.
Speicher, Terry L. Energy conservation for household refrigerators and water heaters. 4,487,032, Cl. 62-183.000.
Spellman High Voltage Electronics Corp.: *See*—
Chambers, Derek, 4,488,214, Cl. 363-71.000.
Spence, John R., to Rockwell International Corporation. Low-power address decoder. 4,488,266, Cl. 365-189.000.
Spencer, Douglas A.: *See*—
Christensen, Tore L.; Haygood, Gail L.; Spencer, Douglas A.; and Szymanski, Steven J., 4,488,294, Cl. 370-84.000.
Spencer, Edward M.: *See*—
Netzel, Philip C.; and Spencer, Edward M., 4,487,660, Cl. 174-28.000.
Speranza, George P.: *See*—
Brennan, Michael E.; and Speranza, George P., 4,487,852, Cl. 521-167.000.
Sperber, Henry V. Reduced fiber insulation nozzle. 4,487,365, Cl. 239-8.000.
Speros, Dimitri M.: *See*—
Mishra, Amarendra; Speros, Dimitri M.; and Eastin, Roger M., 4,487,589, Cl. 445-51.000.
Sperry Corporation: *See*—
Miller, Harry, 4,488,235, Cl. 364-433.000.
Quermann, Thomas R., 4,487,083, Cl. 74-5.460.
Spier, Roger D.: *See*—
Brownlie, Alan W.; and Spier, Roger D., 4,487,600, Cl. 604-35.000.
Spitz, Hubert: *See*—
Jager, Gernot; Spitz, Hubert; and Specht, Herbert, 4,487,575, Cl. 432-1.000.
Spohn, Ralph J., to Exxon Research & Engineering Co. Production of isocyanates from esters of aromatic carbamic acids (urethanes). 4,487,713, Cl. 260-453.00P.
Sprague Electric Company: *See*—
Bates, James S., 4,487,666, Cl. 204-56.00R.
Sprecker, Mark A.; Klemarczyk, Philip T.; and Belko, Robert P., to International Flavors & Fragrances Inc. Process of augmenting or enhancing the aroma of fabric softeners and detergents using cyclohexenyl-alpha-alkyl acrolein derivatives. 4,487,701, Cl. 252-8.600.
Square D Company: *See*—
Grover, Dennis J.; and West, David W., 4,487,330, Cl. 220-324.000.
West, David W.; Hazel, Lonnie R.; and Frederick, John M., 4,487,113, Cl. 98-121.00R.
Srdinko, Klaus-Peter: *See*—
Igel, Richard; Lutz, Alfons; Jardin, Hans; and Srdinko, Klaus-Peter, 4,487,449, Cl. 296-216.000.
Stahl, William L., Jr.: *See*—
Kraft, Wayne R.; Moore, Victor S.; Stahl, William L., Jr.; and Thoma, Nandor G., 4,488,067, Cl. 307-473.000.
Stamicarbon B.V., Licensing Subsidiary of DSM: *See*—
Dunning, Leslie G. W.; and de Warrimont, Jean P. L. M. N., 4,487,886, Cl. 525-86.000.
Standard Oil Company (Indiana): *See*—
Miller, Jeffrey T.; and Nevitt, Thomas D., 4,487,983, Cl. 585-454.000.
Reed, Robert L., 4,487,754, Cl. 423-574.00R.
Stephens, James R., 4,487,921, Cl. 528-363.000.
Stanley Aviation Corp.: *See*—
Gale, Edwin J.; and Valentine, Gordon, 4,487,462, Cl. 339-14.00R.
Stanley Works, The: *See*—
Drechsler, Mark A.; and Rutty, Edward C., 4,487,379, Cl. 242-107.000.
Kelly, John M., 4,487,431, Cl. 283-1.00R.
Stapp, Paul R., to Phillips Petroleum Company. Surfactant and process for enhanced oil recovery. 4,487,703, Cl. 252-8.55D.
Stare, Daniel R., to Eastman Kodak Company. Potassium ion-selective electrode. 4,487,679, Cl. 204-418.000.
Stark, Virgil, to North American Utility Construction Corp. Solar distillation apparatus. 4,487,659, Cl. 202-172.000.
Stauffer Chemical Company: *See*—
Felix, Raymond A., 4,487,724, Cl. 260-502.50F.
Sherif, Fawzy G.; and Michaels, Edwin S., 4,487,632, Cl. 106-85.000.
Sherif, Fawzy G.; Majewski, Helmut W.; and Via, Francis A., 4,487,749, Cl. 423-309.000.
Triplett, Kelly B., 4,487,845, Cl. 502-107.000.
Steag Kernenergie GmbH: *See*—
Bienek, Heinz; von Heesen, Wolfgang; and Wick, Wilhelm, 4,488,048, Cl. 250-506.100.
Stebbins, Donald E.; and Morganstein, Mel, to United States of America, Army. High speed spin test device. 4,487,067, Cl. 73-432.00R.
Steel Heddle Manufacturing Co.: *See*—
Maclay, Robert E., 4,487,234, Cl. 139-196.100.
Steele, Charles S.: *See*—
Paslean, James H.; and Steele, Charles S., 4,487,987, Cl. 568-756.000.
Steinberger, Josef: *See*—
Schmitz, Karl-Heinz; and Steinberger, Josef, 4,487,078, Cl. 73-862.060.
Steiner, Alois, to Maschinenfabrik Sulzer-Ruti AG. Multiple longitudinal traversing shed weaving loom. 4,487,233, Cl. 139-28.000.
Steiner, Walter, to Lacoray S.A. Device for towing a motorcycle. 4,487,284, Cl. 180-219.000.
Steinmetz, Carl C., to RCA Corporation. Method of making a line cathode having localized emissive coating. 4,487,673, Cl. 204-181.00R.
Stemmler, Herbert: *See*—
Furrer, Andreas; Mertl, Vaclau; Milavec, Johann; and Stemmler, Herbert, 4,488,121, Cl. 330-10.000.
Stephen, John F.: *See*—
Kruse, Walter M.; and Stephen, John F., 4,487,977, Cl. 568-730.000.
Kruse, Walter M.; and Stephen, John F., 4,487,978, Cl. 568-730.000.
Stephens, James R., to Standard Oil Company (Indiana). Polyoxadiazole from 5-t-butylisophthalic acid. 4,487,921, Cl. 528-363.000.
Stephens, Richard J.; and Boucher, Harry H., to Election Data Corporation. Data registering apparatus. 4,488,034, Cl. 235-50.00A.
Stephens, Tracy R.: *See*—
Carlin, John A.; Mesch, William G.; Thompson, Randall D.; Beard, Steven A.; and Stephens, Tracy R., 4,487,065, Cl. 73-290.00V.
Sterling, Vaughn C.: *See*—
Jaffe, Mary S.; and Sterling, Vaughn C., 4,487,574, Cl. 431-359.000.
Stern, Howard: *See*—
Di Matteo, Paul; Rademacher, Paul; and Stern, Howard, 4,488,173, Cl. 358-107.000.
Stevens, Victor G.: *See*—
Valori, Giuseppe; Primati, Marco; and Stevens, Victor G., 4,486,940, Cl. 29-509.000.
Stevenson, Richard B.: *See*—
Hegadorn, Joseph L.; Chall, Steven B.; and Stevenson, Richard B., 4,487,023, Cl. 62-1.000.
Stewart, James B.; and Bertelsen, Paul, to Clairol Incorporated. Flocked hair brush. 4,486,915, Cl. 15-187.000.
Stewart, Robert T., to Wink Corporation. Tire chain container apparatus. 4,487,314, Cl. 206-216.000.
Stieber, Michael; and Dreher, Gunther, to MAN Maschinenfabrik Augsburg-Nurnberg AG. Method of sensing the curvature of a guide line. 4,488,234, Cl. 364-424.000.
Stiefel, Max; and Wolfbeiss, Erich, to Babcock-Brown Boveri Reaktor GmbH. Procedure and equipment for injecting gas into liquids. 4,487,740, Cl. 376-256.000.
Stinehelfer, Jonathan J.: *See*—
Herndon, William H.; and Stinehelfer, Jonathan J., 4,488,263, Cl. 365-189.000.
Stobb, Inc.: *See*—
Stobb, Walter J., 4,487,405, Cl. 270-58.000.
Stobb, Walter J., to Stobb, Inc. Method and apparatus for sheet gathering in a side-by-side generally vertical edge alignment. 4,487,405, Cl. 270-58.000.
Stockel, Herbert: *See*—
Kobler, Ingo; Stockel, Herbert; Mauer, Lutz; and Engl, Albert, 4,487,123, Cl. 101-216.000.
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Stogryn, Eugene L.; Ho, W. S. Winston; Montagna, Angelo A.; and Sartori, Guido, to Exxon Research & Engineering Co. Process for preparing secondary aminoether alcohols. 4,487,967, Cl. 564-474.000.
Stolle Corporation, The: *See*—
Carter, Randy E.; and Schmidt, Ernst R., 4,487,030, Cl. 62-141.000.
Stone, William R.: *See*—
Dudley, Kenneth W.; Eves, E. Eugene, II; and Stone, William R., 4,488,027, Cl. 219-10.55A.
Storey, David C. Adjustable musical bridge assembly. 4,487,100, Cl. 84-299.000.
Storni, Angelo: *See*—
Zweifel, Hans; Schilling, Walter; Storni, Angelo; and Bellus, Daniel, 4,487,942, Cl. 549-236.000.
Strader, Dennis L., to Household Manufacturing Inc. Vibration isolator coupling. 4,487,592, Cl. 464-88.000.
Straw, Alan: *See*—
Daykin, Kenneth; and Straw, Alan, 4,487,341, Cl. 222-391.000.
Strolle, Clifford H.: *See*—
Coughlin, James E.; Sommerfeld, Eugene G.; and Strolle, Clifford H., 4,487,909, Cl. 528-60.000.
Struger, Odo J.; and Gray, Jon F., to Allen-Bradley. Programmable controller with control program comments. 4,488,258, Cl. 364-900.000.
Struve, Timm; and Neumann, Harald, to Dyckerhoff & Widmann Aktiengesellschaft. Method of and structure for erecting an artificial island. 4,487,526, Cl. 405-196.000.
Studt, William L.; Riley, Richard L.; and Douglas, George H., to William H. Rorer, Inc. Substituted phenyl amidinoureas. 4,487,779, Cl. 424-278.000.
Studtmann, George H., to Borg-Warner Corporation. Starting system for chopper controlled motor-commutated thyristor inverter. 4,488,101, Cl. 318-800.000.
Stumpp, Gerhard, to Robert Bosch GmbH. Control device for internal combustion engines. 4,487,182, Cl. 123-383.000.
Su, Cheng-Hsiung. Toaster. 4,487,115, Cl. 99-327.000.
Sugimori, Shigeru; Kojima, Tetsuhiko; and Tsuji, Masakazu, to Chisso Corporation. Carboxylic acid cyclohexyl ester derivatives. 4,487,954, Cl. 560-107.000.
Sugimori, Teruhiko; and Tajiri, Noriyuki, to Mitsubishi Rayon Co., Ltd. Process for producing thermoplastic resin. 4,487,857, Cl. 523-335.000.
Sugimoto, Hiroyuki: *See*—
Nakamura, Takashi; Morioka, Yoshihiro; and Sugimoto, Hiroyuki, 4,488,085, Cl. 315-3.000.
Sugino, Takashi; Itoh, Kunio; Wada, Masaru; Shimizu, Hirokazu; Mizuno, Hiroyuki; and Fujimoto, Kazuo, to Matsushita Electric Industrial Co., Ltd. Terraced substrate semiconductor laser. 4,488,306, Cl. 372-46.000.
Sugino, Takashi: *See*—
Shimizu, Hirokazu; Itoh, Kunio; Wada, Masaru; Sugino, Takashi; and Okabe, Takako, 4,488,304, Cl. 372-36.000.
Sugioka, Takami; Miyake, Yuzuru; Murakami, Shoichi; and Ibuki, Hideaki, to Teijin Seiki Co. Ltd. Spindle drive type yarn winding apparatus. 4,487,374, Cl. 242-18.00A.
Sugita, Katsuhiko; and Sainen, Tsutomu, to Tsudakoma Corp. Method of and apparatus for detecting weft yarn in jet looms. 4,487,235, Cl. 139-370.200.
Sugiura, Yasuyuki: *See*—
Morinaga, Shigeki; and Sugiura, Yasuyuki, 4,488,103, Cl. 318-811.000.
Suhre, James R. Sleeve valve internal combustion engine. 4,487,172, Cl. 123-81.00C.
Sullivan, Judy C. Shearing comb. 4,487,211, Cl. 132-45.00R.
Sulzer Brothers Limited: *See*—
Ziegler, Georg, 4,487,611, Cl. 48-69.000.
Sumino, Yoichi, to Tokyo Shibaura Denki Kabushiki Kaisha. Ultrasonic system. 4,487,073, Cl. 73-626.000.
Sumitomo Chemical Company, Limited: *See*—
Suzukamo, Gohfu; and Sakito, Yoji, 4,487,956, Cl. 560-124.000.
Sumitomo Electric Industries, Ltd.: *See*—
Nishie, Mitsuaki; Iguchi, Satoru; and Kono, Ichiro, 4,487,474, Cl. 350-96.210.
Sumitomo Metal Mining Company Limited: *See*—
Chiba, Hiroshi; and Ogura, Shoichi, 4,486,948, Cl. 29-827.000.
Sun, Anthony M. F.: *See*—
Goosen, Mattheus F. A.; O'Shea, Geraldine M.; and Sun, Anthony M. F., 4,487,758, Cl. 424-21.000.
Sun Tech, Inc.: *See*—
Hsu, Chao-Yang; and Ellis, Paul E., Jr., 4,487,973, Cl. 568-454.000.
Sun Ventures, Inc.: *See*—
Recchuite, Alexander D., 4,487,705, Cl. 252-46.600.
Sunaga, Yasumasa: *See*—
Sato, Masamichi; Arai, Noboru; Sunaga, Yasumasa; and Inuiya, Masafumi, 4,488,039, Cl. 250-216.000.
Sundstrand Corporation: *See*—
Burandt, Wesley A.; and Markunas, Albert L., 4,487,109, Cl. 91-506.000.
Christen, Roland W.; and Deichstetter, Alfred A., 4,488,198, Cl. 361-20.000.
Sunnen Products Company: *See*—
Sunnen, Robert M.; and Woltjen, Duane W., 4,486,983, Cl. 51-347.000.
Sunnen, Robert M.; and Woltjen, Duane W., to Sunnen Products Company. Guides for honing heads. 4,486,983, Cl. 51-347.000.
Suntola, Tuomo S.: *See*—
Lindfors, Sven G.; Antson, Jorma O.; Graeffe, Ralf; Pakkala, Arto J.; and Suntola, Tuomo S., 4,488,084, Cl. 313-506.000.
Suthers, Mark S., to Northern Telecom Limited. Equalizer arrangement for mixed-gauge cables. 4,488,126, Cl. 333-18.000.
Sutton Laboratories, Inc.: *See*—
Berke, Philip A.; and Rosen, William E., 4,487,939, Cl. 548-311.000.
Suzawa, Osamu, to Epson Corporation. Backlighted liquid crystal display. 4,487,481, Cl. 350-345.000.
Suzukamo, Gohfu; and Sakito, Yoji, to Sumitomo Chemical Company, Limited. Menthyl 2,2-dimethylcyclopropanecarboxylate and resolution of the same. 4,487,956, Cl. 560-124.000.
Suzuki, Akira: *See*—
Mori, Hidetomo; Suzuki, Akira; Uchida, Riichi; and Sasaki, Shigeru, 4,487,563, Cl. 418-201.000.
Suzuki, Fujio: *See*—
Takahashi, Nobuaki; Takashima, Seiichi; Shibamoto, Takeshi; Suzuki, Fujio; and Tanaka, Kohji, 4,488,182, Cl. 358-310.000.
Suzuki Jidosha Kogyo Kabushiki Kaisha: *See*—
Yokoyama, Hiroshi; and Ishida, Tokuzi, 4,487,185, Cl. 123-432.000.
Suzuki, Masaaki; Izawa, Kenzi; and Kimura, Katsumi, to Honda Motor Co., Ltd. Motorcycle. 4,487,283, Cl. 180-219.000.
Suzuki, Masaharu, to Tokyo Shibaura Denki Kabushiki Kaisha. Power source apparatus for a flash lamp used in a pulse laser apparatus. 4,488,104, Cl. 320-1.000.
Suzuki, Masayuki: *See*—
Toyoda, Yasuhiro; Suzuki, Masayuki; and Yamamichi, Masayoshi, 4,487,492, Cl. 354-234.100.
Suzuki, Nobuhiko. Mop. 4,486,912, Cl. 15-147.00R.
Suzuki, Osamu: *See*—
Oishi, Kengo; and Suzuki, Osamu, 4,488,190, Cl. 360-97.000.
Oishi, Kengo; and Suzuki, Osamu, 4,488,191, Cl. 360-97.000.
Suzuki, Shigeru; Koizumi, Yutaka; Yanagawa, Nobuyuki; Hirakura, Koji; and Imai, Chikara, to Ricoh Company, Ltd. Process of exposing photosensitive member. 4,487,501, Cl. 355-50.000.
Swaney, Richard E.; and Hargrove, John, to Hughes Aircraft Company. Self-adjusting, distributed control, access method for a multiplexed single-signal data bus. 4,488,232, Cl. 364-200.000.
Sweeney, William T., to Conoco Inc. Flexible flange joint coupler. 4,487,438, Cl. 285-349.000.
Swenson, Paula S., to Neptune Products Inc. Bobber with illuminated signal. 4,486,969, Cl. 43-17.000.
Swersey, Burt L.; and Fried, Peter I. Scale of flat construction. 4,487,276, Cl. 177-1.000.
Swiss Aluminium Ltd.: *See*—
Mizrah, Tiberiu; Schepers, Bernhard; and Schroder, Bernd, 4,487,756, Cl. 423-625.000.
Zulauf, Herbert, 4,487,456, Cl. 301-63.00R.
Syme, Duncan C.; Caldwell, Eldon L.; Ferguson, Robert W.; Andors, Derik K.; and McLaughlin, Charles B., Jr., to Vermont Castings, Inc. Fuel burning heating apparatus. 4,487,195, Cl. 126-77.000.
Syntex (U.S.A.) Inc.: *See*—
Christensen, Terrence B.; McNaughton, Allen D.; and Umbach, Steven R., 4,487,602, Cl. 604-137.000.
Syquest Technology: *See*—
Alaimo, Ben, 4,488,187, Cl. 360-77.000.
Syryamin, Jury N.: *See*—
Smolyanitsky, Boris N.; Boginsky, Vladimir P.; Gileta, Vladimir P.; Syryamin, Jury N.; and Terskov, Alexei D., 4,487,273, Cl. 173-55.000.
Szabo, Josef: *See*—
Bartuska, Miloslav; Kroupa, Petr; Szabo, Josef; and Zverina, Karel, 4,487,841, Cl. 501-105.000.
Szoke, Sandor; Lugosi, Gyorgy; Bakonyi, Maria; Ghyczy, Jeno ; and Csermely, Gyorgy, to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Rt. Preparation of alkylthiobenzimidazoles. 4,487,936, Cl. 548-139.000.
Szymanski, Steven J.: *See*—
Christensen, Tore L.; Haygood, Gail L.; Spencer, Douglas A.; and Szymanski, Steven J., 4,488,294, Cl. 370-84.000.
T.B.E.: *See*—
Adamick, S. Mark, 4,487,443, Cl. 294-151.000.
T. C. Manufacturing Co.: *See*—
Roen, Ralph M., 4,487,318, Cl. 206-554.000.
T. S. Simms & Co. Limited: *See*—
Simms, Gordon R.; Allison, Philip J.; and Benson, Cameron R., 4,487,565, Cl. 425-115.000.
Tabak, Samuel A., to Mobil Oil Corporation. Catalytic conversion with catalyst regeneration sequence. 4,487,985, Cl. 585-517.000.
Tabata, Fumio; Asakawa, Kazuo; and Komoriya, Hitoshi, to Fujitsu Limited. Robot arm control method using open loop control in combination with closed loop control. 4,488,242, Cl. 364-513.000.
Tahiliani, Vasu H., to Electric Power Research Institute. Arc by-products evacuation and neutralization system. 4,487,746, Cl. 422-170.000.
Tajiri, Noriyuki: *See*—
Sugimori, Teruhiko; and Tajiri, Noriyuki, 4,487,857, Cl. 523-335.000.
Takagi, Mikio: *See*—
Shioya, Yoshimi; and Takagi, Mikio, 4,487,787, Cl. 427-8.000.
Takahashi, Mineo: *See*—
Uchikawa, Naoshi; Takahashi, Mineo; and Watanabe, Hiromu, 4,487,560, Cl. 418-55.000.
Takahashi, Nobuaki; Takashima, Seiichi; Shibamoto, Takeshi; Suzuki, Fujio; and Tanaka, Kohji, to Victor Company of Japan, Limited.

System for recording and reproducing time-division multiplexed digital audio and video signals. 4,488,182, Cl. 358-310.000.

Takakusagi, Tsunehiko; and Kikuchi, Keizo, to Hitachi, Ltd. Apparatus for controlling operation of hydraulic machine. 4,487,549, Cl. 415-30.000.

Takamatsu, Takeshi, to Olympus Optical Co., Ltd. Endoscopic photographing apparatus. 4,487,489, Cl. 354-62.000.

Takamatsu, Toshiaki: *See*—
Nonomura, Keisaku; Takamatsu, Toshiaki; Uede, Hisashi; and Wada, Tomio, 4,487,480, Cl. 350-335.000.

Takamura, Kozo: *See*—
Kondo, Ryoji; Higuchi, Kanji; Takamura, Kozo; Sato, Yasuyuki; and Nagai, Minoru, 4,488,081, Cl. 313-141.000.

Takashima, Katsuhiko; Moriwaki, Katsuhiro; and Taniguchi, Koichi, to Toyo Cloth Co., Ltd. Method of producing moisture-permeable artificial leather. 4,487,642, Cl. 156-77.000.

Takashima, Seiichi: *See*—
Takahashi, Nobuaki; Takashima, Seiichi; Shibamoto, Takeshi; Suzuki, Fujio; and Tanaka, Kohji, 4,488,182, Cl. 358-310.000.

Takasugi, Hisashi: *See*—
Takaya, Takao; Masugi, Takashi; Takasugi, Hisashi; and Kochi, Hiromu, 4,487,767, Cl. 424-246.000.
Takaya, Takao; Masugi, Takashi; Takasugi, Hisashi; and Miyai, Kenzi, 4,487,768, Cl. 424-246.000.
Takaya, Takao; Takasugi, Hisashi; Masugi, Takashi; Yamanaka, Hideaki; and Kawabata, Kohji, 4,487,927, Cl. 544-22.000.

Takatsuka, Toru: *See*—
Gomi, Shimpei; Arai, Tomio; Takeuchi, Tomomitsu; Miwa, Shigeru; Takatsuka, Toru; and Watari, Ryuzo, 4,487,686, Cl. 208-48.00R.

Takaya, Takao; Masugi, Takashi; Takasugi, Hisashi; and Kochi, Hiromu, to Fujisawa Pharmaceutical Co., Ltd. 7-[Amino or carboxy substituted oxyimino]-3-[amino or alkoxy substituted heterocyclic thiomethyl] cephalosporin derivatives. 4,487,767, Cl. 424-246.000.

Takaya, Takao; Masugi, Takashi; Takasugi, Hisashi; and Miyai, Kenzi, to Fujisawa Pharmaceutical Co., Ltd. Cephem compounds. 4,487,768, Cl. 424-246.000.

Takaya, Takao; Takasugi, Hisashi; Masugi, Takashi; Yamanaka, Hideaki; and Kawabata, Kohji, to Fujisawa Pharmaceutical Co., Ltd. 3-Phosphonium and 3-phosphoranylidenecephems. 4,487,927, Cl. 544-22.000.

Takayanagi, Akitoshi; and Kano, Tokio, to Olympus Optical Co. Ltd. Method and apparatus for detecting boundary surface between blood plasma and blood corpuscle suspension. 4,487,836, Cl. 436-2.000.

Takayanagi, Yoshiaki; and Matsunaga, Takao, to Komatsu Zenoah Co. Vibration damper device. 4,487,402, Cl. 267-141.200.

Takayasu, Mitsuru: *See*—
Nao, Manabu; Takayasu, Mitsuru; and Oikawa, Shyuetsu, 4,487,306, Cl. 194-4.00C.

Takeda Chemical Industries, Ltd.: *See*—
Fujino, Masahiko; and Nishimura, Osamu, 4,487,726, Cl. 260-543.00R.

Takeda, Kenji: *See*—
Inagaki, Mitsuo; Takeda, Kenji; and Ito, Seitoku, 4,487,562, Cl. 418-84.000.

Takeda Riken Co., Ltd.: *See*—
Kurihara, Takenori, 4,488,123, Cl. 331-2.000.

Takeda, Takashi; Yamamoto, Osamu; Murata, Kousaku; and Yamamoto, Kazumasa, to Matsushita Electric Industrial Co., Ltd. Diaphragm for loudspeaker. 4,487,877, Cl. 524-413.000.

Takeda, Yoshimitsu: *See*—
Mochida, Haruo; Takeda, Yoshimitsu; Fukasawa, Takeshi; Masaki, Mikio; Shimizu, Kiichi; and Kobayashi, Satoru, 4,487,042, Cl. 70-186.000.

Takeda, Yumiko: *See*—
Kato, Yoshinori; Umemoto, Naoji; Takeda, Yumiko; and Hara, Takeshi, 4,487,714, Cl. 260-112.00B.

Takehara, Hideaki; Wada, Yoshiyo; Goto, Kunio; and Segawa, Keiji, to Victor Company of Japan, Limited. Capacitance detection type record stylus having a conductive shank. 4,488,281, Cl. 369-126.000.

Takemoto, George S.; and Boudreau, Joseph A., to Kendall Company, The. Repositionable pressure-sensitive adhesive composition. 4,487,872, Cl. 524-127.000.

Takenaga, Hideo; Ichikawa, Hiroki; and Orita, Shunichi, to Olympus Optical Co., Ltd. Remote control device for tape recorder. 4,488,196, Cl. 360-137.000.

Takenaka Doboku Co., Ltd.: *See*—
Sakuta, Masaharu; Kiya, Soichi; Uchizaki, Iwao; Yoshioka, Yasuhiko; Ito, Koichi; Saito, Toshio; Kaya, Tadahiro; Shioya, Tsunetoshi; and Shimoyama, Yoshifumi, 4,487,633, Cl. 106-90.000.

Takenaka Komuten Co., Ltd.: *See*—
Sakuta, Masaharu; Kiya, Soichi; Uchizaki, Iwao; Yoshioka, Yasuhiko; Ito, Koichi; Saito, Toshio; Kaya, Tadahiro; Shioya, Tsunetoshi; and Shimoyama, Yoshifumi, 4,487,633, Cl. 106-90.000.

Takeno, Hidekazu: *See*—
Kitaura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Aratani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; and Hashimoto, Masashi, 4,487,763, Cl. 424-177.000.

Takeuchi, Tomomitsu: *See*—
Gomi, Shimpei; Arai, Tomio; Takeuchi, Tomomitsu; Miwa, Shigeru; Takatsuka, Toru; and Watari, Ryuzo, 4,487,686, Cl. 208-48.00R.

Taku, Mizuno: *See*—
Yoko, Kusakabe; and Taku, Mizuno, 4,487,762, Cl. 424-120.000.

Tamaki, Taro: *See*—
Aoki, Nobuo; and Tamaki, Taro, 4,487,718, Cl. 260-112.50R.

Tamura, Thoru: *See*—
Shono, Masaru; Kawakami, Takahiro; Matsumoto, Toshiyuki; Tamura, Thoru; and Matsumoto, Hideki, 4,487,524, Cl. 405-50.000.

Tanabe, Takeshi, to Sharp Kabushiki Kaisha. Combined high-frequency and thermal heating oven. 4,488,025, Cl. 219-10.55B.

Tanabe, Takeshi, to Sharp Kabushiki Kaisha. Microwave oven with automatic cooking performance having additional heating process. 4,488,026, Cl. 219-10.55B.

Tanaka, Hirokazu: *See*—
Kitaura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Aratani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; and Hashimoto, Masashi, 4,487,763, Cl. 424-177.000.

Tanaka, Kohji: *See*—
Takahashi, Nobuaki; Takashima, Seiichi; Shibamoto, Takeshi; Suzuki, Fujio; and Tanaka, Kohji, 4,488,182, Cl. 358-310.000.

Tanaka, Masaaki; Sato, Yukio; Hishii, Masao; and Nagai, Haruhiko, to Mitsubishi Denki Kabushiki Kaisha. Gas laser apparatus. 4,488,309, Cl. 372-87.000.

Tanaka, Shinichi; and Hirose, Namio, to Matsushita Electric Industrial Co., Ltd. Information read apparatus with tracking control system. 4,488,276, Cl. 369-46.000.

Tanaka, Yoshikazu: *See*—
Morimoto, Yoshiro; Yamamuro, Sigeaki; Hirano, Hiroyuki; and Tanaka, Yoshikazu, 4,487,302, Cl. 192-4.00A.

Tange, Shoji: *See*—
Inoue, Ryuzaburo; Tange, Shoji; and Nakagawa, Yasuhiko, 4,487,188, Cl. 123-491.000.

Taniguchi, Hiroki: *See*—
Ishikawa, Nobuo; and Taniguchi, Hiroki, 4,487,926, Cl. 536-82.000.

Taniguchi, Koichi: *See*—
Takashima, Katsuhiko; Moriwaki, Katsuhiro; and Taniguchi, Koichi, 4,487,642, Cl. 156-77.000.

Tanizaki, Hiroyuki; Ogawa, Takayoshi; and Ozaki, Yoshimi, to Nissan Motor Company, Limited. Rotatable seat for an automotive vehicle. 4,487,452, Cl. 297-349.000.

Taravella, Jody J.: *See*—
Astley, Vivian C.; and Taravella, Jody J., 4,487,750, Cl. 423-321.00R.

Tarumi, Noriyoshi; Iwahashi, Haruo; Matsunawa, Masahiko; and Tokunaga, Hiroshi, to Konishiroku Photo Industry Co., Ltd. Electrostatic apparatus. 4,488,160, Cl. 346-154.000.

Tatemoto, Masayoshi; and Amano, Toshihiko, to Daikin Kogyo Co., Ltd. Fluorine-containing elastomeric copolymers, and their production. 4,487,903, Cl. 526-247.000.

Tatsuta, Sumitaka: *See*—
Miyoshi, Takahito; Okutu, Toshimitu; Fujiyama, Masaaki; Tatsuta, Sumitaka; and Tsuji, Nobuo, 4,487,802, Cl. 428-336.000.

Tatum, James R. Damper blade actuating mechanism. 4,487,214, Cl. 137-72.000.

Taylor, Attalee S.: *See*—
Fedder, James L.; and Taylor, Attalee S., 4,487,468, Cl. 339-75.0MP.

Taylor, David J., to General Motors Corporation. Brake control system for an articulated vehicle. 4,487,425, Cl. 280-432.000.

Taylor, Frederick G.; and Casqueiro, Lawrence, to American Can Company. Method and apparatus for the scoring and parting of can bodies. 4,487,539, Cl. 413-55.000.

Taylor, Junius E.: *See*—
Acker, Loren C.; Taylor, Junius E.; and Minney, Stephen C., 4,488,028, Cl. 219-10.810.

Taylor, Keith: *See*—
Haines, Doug; Taylor, Keith; and Kaufman, Murlan, 4,488,093, Cl. 315-375.000.

Taylor, Larry D.; Miller, David M.; and Thakur, Pramod C., to Conoco Inc. Method of reducing mine dust. 4,487,615, Cl. 55-84.000.

Taylor, Wayne A.: *See*—
O'Brien, Harold A., Jr.; Barnes, John W.; Taylor, Wayne A.; Thomas, Kenneth E.; and Bentley, Glenn E., 4,487,738, Cl. 376-192.000.

TDK Corporation: *See*—
Adachi, Hiromi; and Iwaya, Shoichi, 4,488,087, Cl. 315-101.000.
Sawamura, Kentaro, 4,487,734, Cl. 264-61.000.

Teague, Henry B.: *See*—
Lipsey, William S.; and Teague, Henry B., 4,488,250, Cl. 364-709.000.

Technicon Instruments Corporation: *See*—
Kanter, Robert J., 4,487,700, Cl. 210-789.000.

Teijin Limited: *See*—
Kato, Yoshinori; Umemoto, Naoji; Takeda, Yumiko; and Hara, Takeshi, 4,487,714, Cl. 260-112.00B.

Teijin Seiki Co. Ltd.: *See*—
Sugioka, Takami; Miyake, Yuzuru; Murakami, Shoichi; and Ibuki, Hideaki, 4,487,374, Cl. 242-18.00A.

Tektronix, Inc.: *See*—
Haines, Doug; Taylor, Keith; and Kaufman, Murlan, 4,488,093, Cl. 315-375.000.

Telecopt Co.: *See*—
Signorile, Eugene R., 4,488,147, Cl. 340-636.000.

Teledyne Industries, Inc.: *See*—
Siddall, Mark B., 4,487,629, Cl. 75-84.400.

Telenkov, Vyacheslav V.: *See*—
Dshkhunian, Valery L.; Kovalenko, Sergei S.; Mashevich, Pavel R.; and Telenkov, Vyacheslav V., 4,488,264, Cl. 365-189.000.

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Smolyanitsky, Boris N.; Boginsky, Vladimir P.; Gileta, Vladimir P.; Syryamin, Jury N.; and Terskov, Alexei D., 4,487,273, Cl. 173-55.000.

Terui, Nobuo, to Olympus Optical Co., Ltd. Tape run control device for microcassette tape recorder. 4,488,186, Cl. 360-71.000.

Tessier, Jean: *See—*
Martel, Jacques; Tessier, Jean; and Demoute, Jean-Pierre, 4,487,957, Cl. 560-177.000.

Tetras, S.A.: *See—*
Hoffman, Lionel B., 4,487,499, Cl. 355-14.0SH.

Texaco Inc.: *See—*
Brennan, Michael E.; and Speranza, George P., 4,487,852, Cl. 521-167.000.
Dominguez, Richard J. G., 4,487,908, Cl. 528-48.000.
Paulean, James H.; and Steele, Charles S., 4,487,987, Cl. 568-756.000.
Pittman, Robert W.; and Fontaine, Marc F., 4,487,260, Cl. 166-259.000.
Sanderson, John R., 4,487,974, Cl. 568-570.000.
Sellstrom, Kathy B., 4,487,805, Cl. 428-413.000.
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Zimmerman, Robert L.; and Dominguez, Richard J. G., 4,487,912, Cl. 528-52.000.

Texas Instruments Incorporated: *See—*
Frantz, Gene A., 4,488,005, Cl. 179-18.00B.
Lam, Hon W.; and Yuan, Ham-Tzong, 4,487,639, Cl. 148-175.000.

Th. Goldschmidt AG: *See—*
Koerner, Gotz; Priesch, Manfred; Rau, Harald; and Schamberg, Eckehard, 4,487,809, Cl. 428-447.000.

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Taylor, Larry D.; Miller, David M.; and Thakur, Pramod C., 4,487,615, Cl. 55-84.000.

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Panora, Robert A., 4,487,691, Cl. 210-167.000.

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Smith, Stuart B., 4,487,816, Cl. 428-423.300.

Theurer, Walter C.: *See—*
Zalewski, Jack J.; and Theurer, Walter C., 4,488,020, Cl. 200-76.000.

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Kraft, Wayne R.; Moore, Victor S.; Stahl, William L., Jr.; and Thoma, Nandor G., 4,488,067, Cl. 307-473.000.

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O'Brien, Harold A., Jr.; Barnes, John W.; Taylor, Wayne A.; Thomas, Kenneth E.; and Bentley, Glenn E., 4,487,738, Cl. 376-192.000.

Thomas, William R. L., to Exxon Research & Engineering Co. High efficiency multiple layer, all solid-state luminescent solar concentrator. 4,488,047, Cl. 250-486.100.

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Carlin, John A.; Mesch, William G.; Thompson, Randall D.; Beard, Steven A.; and Stephens, Tracy R., 4,487,065, Cl. 73-290.00V.

Thompson, Robert; and van Husen, Hendrik W., to GTE Automatic Electric Inc. Hall effect device test circuit. 4,488,112, Cl. 324-202.000.

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Benoit-Gonin, Roger; Berger, Jean L.; and Coutures, Jean L., 4,488,129, Cl. 333-165.000.
Claverie, Claude; and Eouzan, Jean-Yves, 4,488,305, Cl. 372-38.000.
Hoet, Roger, 4,488,086, Cl. 315-39.000.
Meignin, Jacques; Mollaret, Daniel; and Prost, Roger, 4,487,037, Cl. 62-514.00R.

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Chataignon, Andre ; Poirier, Jean-Pierre; and Phan Tich, Du, 4,488,007, Cl. 179-81.00B.

Thorp, Edward J.: *See—*
Rork, Gerald D.; Thorp, Edward J.; and Zegarski, Ronald J., 4,488,044, Cl. 250-381.000.

Thrailkill, William O.: *See—*
Clay, Burton R.; and Thrailkill, William O., 4,488,042, Cl. 250-235.000.

Tieleman B.V.: *See—*
Tieleman, Rudolf J.; and Hazenbroek, Jacobus E., 4,486,920, Cl. 17-52.000.

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Harrison, Thomas R.; and Tien, Ping K., 4,488,038, Cl. 250-211.00J.

Tillotson, John, to Gulf & Western Manufacturing Company. Multiple contact header assembly. 4,487,463, Cl. 339-17.00C.

Timex Medical Products Corporation: *See—*
Kamens, Bruce H., 4,487,208, Cl. 128-736.000.

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Korshunov, Evgeny A.; Kuznetsov, Alexandr N.; Ovodenko, Maxim B.; Kuzmin, Gennady G.; Kostrov, Valery P.; Timofeev, Alexandr N.; Bastrikov, Valery L.; and Meschaninova, Tatyana V., 4,487,250, Cl. 164-473.000.

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Tinsley Wire (Sheffield) Limited: *See—*
Ball, Anthony F., 4,487,000, Cl. 52-660.000.

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Antonov, Veniamin V.; Bat, Jury I.; Gamalei, Edvin I.; Dolzhenkov, Fedor E.; Donskoi, Semen A.; Kulichenko, Valentin A.; Tischenko, Oleg I.; Shtepa, Evgeny D.; and Chervonenko, Viktor M., 4,487,397, Cl. 266-44.000.

Tittes, Allan F.; Larson, Kenneth H.; Burton, Elmer E.; and Britton, Kennith L., to Inspiration Consolidated Copper Company. Converter for refining liquid metal. 4,487,399, Cl. 266-158.000.

Titus Tool Company Limited: *See—*
Appleby, Robert H.; and Cove, Peter L., 4,487,522, Cl. 403-231.000.

Toa Medical Electronics Co., Ltd.: *See—*
Okada, Tokuhiro; Hayashi, Masayoshi; and Matsumoto, Hideaki, 4,488,248, Cl. 364-555.000.

Toba, Akira, to Tokyo Shibaura Denki Kabushiki Kaisha. Assemble editing system for video tape recorder. 4,488,185, Cl. 360-14.100.

Todoroff, Pete G.: *See—*
Haller, Kurt H.; Lieb, Carl; and Todoroff, Pete G., 4,487,166, Cl. 122-406.0ST.

Toevank, Berend J.; and Hobbelt, Hendrik J. H., to Trutzschler GmbH & Co. KG. Apparatus for separating impurities from fiber material. 4,486,922, Cl. 19-200.000.

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Tokyo Keiki Company Limited: *See—*
Terakawa, Takashige; and Akaba, Noriyuki, 4,488,157, Cl. 343-771.000.

Tokyo Kogaku Kikai Kabushiki: *See—*
Iwafune, Yasuo, 4,488,050, Cl. 250-578.000.

Tokyo Shibaura Denki K.K.: *See—*
Mishima, Toshio, 4,487,098, Cl. 84-1.030.

Tokyo Shibaura Denki Kabushiki Kaisha: *See—*
Matsuzaki, Kaoru, 4,488,200, Cl. 361-104.000.
Mori, Hisamitsu, 4,487,514, Cl. 384-113.000.
Nokihara, Yutaka; and Nakajyo, Hironori, 4,488,273, Cl. 369-11.000.
Sumino, Yoichi, 4,487,073, Cl. 73-626.000.
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Tsutsumi, Teruo; and Hori, Masao, 4,488,161, Cl. 346-155.000.

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Tolco Incorporated: *See—*
Heath, Richard W., 4,487,387, Cl. 248-59.000.

Tolomeo, Joseph F., Sr. Hunter's rear viewing mirror device. 4,487,479, Cl. 350-615.000.

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Ruyak, Robert F.; Silver, Theodore R.; and Tomasino, Rocco J., 4,487,557, Cl. 417-420.000.

Tominaga, Michiaki; Yang, Yung-hsiung; Ogawa, Hidenori; and Nakagawa, Kazuyuki, to Otsuka Pharmaceutical Co. Ltd. Carbostyril derivatives and their salts. 4,487,772, Cl. 424-250.000.

Tomita, Akira, to AMP Incorporated. Shielded electrical cable. 4,487,992, Cl. 174-36.000.

Tomita, Takao; and Kishizawa, Yuji, to Honda Motor Co., Ltd. Engine suspension system. 4,487,285, Cl. 180-228.000.

Toppan Printing Co., Ltd.: *See—*
Watanabe, Niro; Nemoto, Shiro; Yasujima, Hiroyuki; and Yoshida, Kaneki, 4,487,826, Cl. 430-176.000.

Toray Industries, Inc.: *See—*
Fukuda, Tadanori; and Sakamoto, Sadayuki, 4,487,904, Cl. 526-301.000.

Toray Silicone Co., Ltd.: *See—*
Fukayama, Miyoji; and Ichijo, Chikara, 4,487,907, Cl. 528-32.000.

Torii, Shunichi: *See—*
Inagami, Yasuhiro; Nagashima, Shigeo; Omoda, Koichiro; and Torii, Shunichi, 4,488,247, Cl. 364-765.000.

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Toska Co., Ltd.: *See—*
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Toth, John E.: *See—*
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Pounder, Edwin; Arena, Alan J.; Pawlowski, Michael; and Totten, Adrian M., 4,487,333, Cl. 222-54.000.
Tourillon, Gerard: *See—*
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Towmotor Corporation: *See—*
Field, Jesse L., Jr., 4,487,106, Cl. 91-436.000.
Townsend Engineering Company: *See—*
Townsend, Ray T., 4,487,119, Cl. 99-487.000.
Townsend, Ray T., to Townsend Engineering Company. Means for injecting fluids into meat products. 4,487,119, Cl. 99-487.000.
Toyama, James. Fluid pipe generator. 4,488,055, Cl. 290-53.000.
Toyo Cloth Co., Ltd.: *See—*
Takashima, Katsuhiko; Moriwaki, Katsuhiro; and Taniguchi, Koichi, 4,487,642, Cl. 156-77.000.
Toyo Soda Manufacturing Co., Ltd.: *See—*
Oyama, Kiyotaka; Irino, Shigeaki; and Hagi, Norio, 4,487,717, Cl. 260-112.50R.
Toyoda, Kazuhiro, to Fujitsu Limited; and Fujitsu Limited. Semiconductor memory. 4,488,268, Cl. 365-203.000.
Toyoda, Yasuhiro; Suzuki, Masayuki; and Yamamichi, Masayoshi, to Canon Kabushiki Kaisha. Electromagnetically controlled shutter. 4,487,492, Cl. 354-234.100.
Toyota Jidosha Kabushiki Kaisha: *See—*
Iwamoto, Kuniharu, 4,487,051, Cl. 72-312.000.
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Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Isobe, Toshiaki, 4,487,190, Cl. 123-492.000.
Toyota Jidoshakogyo: *See—*
Arakawa, Susumu; Tsukigahora, Tooru; and Shirai, AKira, 4,487,021, Cl. 60-534.000.
Trachtenberg, Joseph J., to Interdynamics, Inc. Heater assembly for heating glass surface. 4,488,033, Cl. 219-522.000.
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Foye, David M., 4,487,028, Cl. 62-115.000.
Transformatoren Union Aktiengesellschaft: *See—*
Pfeiffer, Richard, 4,488,134, Cl. 336-58.000.
Traynor, Lee, to B. F. Goodrich Company, The. Polymethylene pyrroles and electrically conductive polymers thereof. 4,487,667, Cl. 204-59.00R.
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Trebor Industries, Inc.: *See—*
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Treise, Jan E.; and Beningfield, Harley W., to Rockwell International Corporation. Phase detector error compensation apparatus. 4,488,108, Cl. 324-83.00D.
Treseder, Robert C., to International Business Machines Corporation. Cooling arrangement for hermetically sealed disk files. 4,488,192, Cl. 360-98.000.
Trio Kabushiki Kasha: *See—*
Kurata, Hirotaka, 4,488,184, Cl. 358-342.000.
Triplett, Kelly B., to Stauffer Chemical Company. Method of enhancing stereospecificity of a catalyst system. 4,487,845, Cl. 502-107.000.
Troost, Marcel A., to Siemens Aktiengesellschaft. PCM-TDM Switching system using time slot multiples. 4,488,292, Cl. 370-63.000.
Trotta, Robert A., to Gillette Company, The. Shaving implement. 4,486,952, Cl. 30-47.000.
Trotter, Jimmy R.; Joyner, Frederick B.; and McConnell, Richard L., to Eastman Kodak Company. Polyester waxes based on 1,12-dodecanedioic acid. 4,487,919, Cl. 528-272.000.
Troutner, Vernon H., to Extracorporeal Medical Specialties, Inc. Peristaltic pump. 4,487,558, Cl. 417-477.000.
Trutzschler GmbH & Co. KG: *See—*
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Tsumura, Toshihiro. Path indicating apparatus of moving vehicle. 4,488,233, Cl. 364-424.000.
Tsutsumi, Teruo; and Hori, Masao, to Tokyo Shibaura Denki Kabushiki Kaisha. Electrostatic recording head, a method for manufacturing the same, and an apparatus for practicing this method. 4,488,161, Cl. 346-155.000.
Tucker, Russell E.: *See—*
Fancey, Everett G.; Peters, John V.; and Tucker, Russell E., 4,486,967, Cl. 43-4.500.
Tucker, Thomas L.; and Clark, Bill B., to Magnavox Government and Industrial Electronics Company. Apparatus for tool storage and selection. 4,486,928, Cl. 29-26.00A.
Turbak, Albin F.; Snyder, Fred W.; and Sandberg, Karen R., to International Telephone and Telegraph Corporation. Suspensions containing microfibrillated cellulose. 4,487,634, Cl. 106-203.000.
Turley, Alfred P.: *See—*
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Turnbull, Everett M.; and Charbonneau, Jack W., to Minnesota Mining and Manufacturing Company. Fragrance-releasing pull-apart sheet. 4,487,801, Cl. 428-313.500.
Turner, Jonathan S., to AT&T Bell Laboratories. End-to-end information memory arrangement in a line controller. 4,488,288, Cl. 370-60.000.
Turner, Jonathan S., to AT&T Bell Laboratories. Interface facility for a packet switching system. 4,488,289, Cl. 370-60.000.
Turunen, Pekka J. Vehicle splash apron. 4,487,422, Cl. 280-154.50R.
Tyrer, J. David: *See—*
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U.M. Corporation: *See—*
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Uchikawa, Naoshi; Takahashi, Mineo; and Watanabe, Hiromu, to Hitachi, Ltd. Scroll fluid compressor with surface finished flat plates engaging the wraps. 4,487,560, Cl. 418-55.000.
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Ueno, Hideyuki, to Toska Co., Ltd.; Bano'k Co., Ltd.; and Ben Clements & Sons, Inc. Tag attaching device. 4,487,354, Cl. 227-67.000.
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Ito, Ryoichi; Murakami, Osamu; Nakamura, Masayuki; Higo, Kazuo; and Ueno, Kengi, 4,487,180, Cl. 123-333.000.
Ueno, Kouji; and Miyamura, Tamio, to Fujitsu Limited. Field programmable device. 4,488,261, Cl. 365-104.000.
Ueno, Susumu; and Kamata, Hideaki, to Shin-Etsu Chemical Co., Ltd. Method for imparting improved surface properties to carbon fibers and composite. 4,487,880, Cl. 524-495.000.
Ueta, Yutaka; Kawachi, Shoji; and Hosokawa, Kazutaka, to Daikin Kogyo Co., Ltd. Fluoroelastomer composition. 4,487,882, Cl. 524-505.000.
Uhlig, Albert R., to Owens-Illinois, Inc. Carbonated beverage package. 4,487,326, Cl. 215-307.000.
Uhlin, Bernt E.; Nordstrom, Kurt; Molin, Soeren; and Gustaffson, Petter, to A/S Alfred Benzon. Plasmid having temperature dependent plasmid copy number. 4,487,835, Cl. 435-317.000.
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Umemura, Shizuo; and Kitamoto, Tatsuji, to Fuji Photo Film Co., Ltd. Method for preparing ferromagnetic metal particles. 4,487,627, Cl. 75-0.5BA.
Union Carbide Corporation: *See—*
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Domeier, Linda A., 4,487,798, Cl. 428-288.000.
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Union Oil Company of California: *See—*
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United Kingdom Atomic Energy Authority: *See—*
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United States Steel Corporation: *See—*
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Morrison, Terry; Howlett, James J.; and Zagranski, Raymond D., 4,488,236, Cl. 364-442.000.
Schwarz, Frederick M.; and Griffin, James G., 4,487,016, Cl. 60-204.000.
University of California, The Regents of the: *See—*
Nitecki, Danute E.; and Bhatnagar, Pradip K., 4,487,715, Cl. 260-112.50R.
UOP Inc.: *See—*
Arena, Blaine J., 4,487,980, Cl. 568-863.000.
Imai, Tamotsu, 4,487,984, Cl. 585-454.000.
Massie, Stephen N.; and Broyles, Allen R., 4,487,753, Cl. 423-573.00R.
McMichael, Charles W., Jr., 4,487,259, Cl. 166-228.000.
Robinson, Delmar W.; Johnson, Russell W.; and Moser, Mark D., 4,487,848, Cl. 502-223.000.
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McCall, John M., 4,487,774, Cl. 424-256.000.
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Miyamoto, Issei; Utsumi, Shunji; and Chikaraishi, Takayo, 4,487,441, Cl. 292-336.300.
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Vaid, Hoshang, to Fairchild Camera and Instrument Corp. Programmable deskewing of automatic test equipment. 4,488,297, Cl. 371-1.000.
Valentine, Gordon: *See—*
Gale, Edwin J.; and Valentine, Gordon, 4,487,462, Cl. 339-14.00R.
Valori, Giuseppe; Primati, Marco; and Stevens, Victor G., to Singer Company, The. Method of forming a sewing machine hook assembly. 4,486,940, Cl. 29-509.000.
Vamco Machine and Tool, Inc.: *See—*
Paris, Edward S., 4,487,352, Cl. 226-142.000.
van Beek, Johann R. G. C. M.: *See—*
Willems, Johannes J. G. S. A.; van Beek, Johann R. G. C. M.; and Buschow, Kurt H. J., 4,487,817, Cl. 429-27.000.
Vance, Ian A. W., to International Standard Electric Corporation. Integrated circuit with a common power supply for silicon and gallium arsenide circuit portions. 4,488,064, Cl. 307-297.000.
Vanderhoff, John W.: *See—*
Shih, Yen-Jer; El-Aasser, Mohamed S.; and Vanderhoff, John W., 4,487,855, Cl. 523-201.000.
van der Lely, Cornelis. Tractor. 4,487,286, Cl. 180-235.000.
van der Merwe, Izak F. Pumping and tire deflation warning system. 4,487,241, Cl. 152-428.000.
van Husen, Hendrik W.: *See—*
Thompson, Robert; and van Husen, Hendrik W., 4,488,112, Cl. 324-202.000.
Van Ryn, John. Tool and implement carrier. 4,487,135, Cl. 108-50.000.
Van Sloun, Peter H., to Honeywell Inc. Safety ring/firing pin for explosive device. 4,487,128, Cl. 102-261.000.
Van Wyngaarden, George, to London Machinery Company Limited. Portable waste processing unit. 4,487,507, Cl. 366-20.000.
Vassar, Edward R., to Raytheon Company. Floating point addition architecture. 4,488,252, Cl. 364-748.000.
Vassell, William C.: *See—*
Logothetis, Eleftherios M.; and Vassell, William C., 4,487,680, Cl. 204-426.000.
Vasta, Joseph A., to Du Pont de Nemours, E. I., and Company. Coating composition of a solution fluorocarbon polymer, a dispersed fluorocarbon polymer and a polyamine curing agent. 4,487,878, Cl. 524-413.000.
Vauthier, Bernard: *See—*
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Veltri, Richard D.: *See—*
Galasso, Francis S.; and Veltri, Richard D., 4,487,799, Cl. 428-334.000.
Venkatesan, V. N.; and Shu, Winston R., to Mobil Oil Corporation. Drive for heavy oil recovery. 4,487,262, Cl. 166-271.000.
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Versteeg, Frits J., to N.V. Optische Industria "De Oude Delft". Catadioptric objective. 4,487,483, Cl. 350-444.000.
Vesuvius Crucible Company: *See—*
Cahoon, John B.; and Fichter, Mark K., 4,487,251, Cl. 164-475.000.
Veta, Ross E.: *See—*
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VG Instruments Group Limited: *See—*
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Victor Company of Japan, Limited: *See—*
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Saito, Takashi; Uchida, Masayoshi; Mochizuki, Masafumi; and Arai, Norimasa, 4,488,286, Cl. 369-292.000.
Takahashi, Nobuaki; Takashima, Seiichi; Shibamoto, Takeshi; Suzuki, Fujio; and Tanaka, Kohji, 4,488,182, Cl. 358-310.000.
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Vieler, Friedrich: *See—*
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Vinciguerra, Costantino, to Nuovo Pignone S.p.A. Gas generator and turbine unit. 4,487,014, Cl. 60-39.310.
Vitale, George: *See—*
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Vives, Charles, to Societe de Vente de L'Aluminum Pechiney. Device for heating, mixing and/or transferring metals in the liquid state. 4,487,401, Cl. 266-234.000.
VLSI Technology Research Association: *See—*
Hirata, Yoshihiro; Miyake, Kuniaki; and Yakushiji, Hisao, 4,487,161, Cl. 118-723.000.
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Passerell, David P.; and Volgstadt, Frank R., 4,487,432, Cl. 285-15.000.
Vollmar, Kurt, to Pfaff Industriemaschinen GmbH. Presser foot drive linkage in a sewing machine. 4,487,145, Cl. 112-320.000.
Vonco Products, Inc.: *See—*
Harreld, Donald R.; and Wiessner, Martin G., 4,486,975, Cl. 446-220.000.

von der Heide, Johann: *See*—
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Von Holdt, John W. Split mold lock. 4,487,564, Cl. 425-451.900.
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Skuballa, Werner; Raduechel, Bernd; Schwarz, Norbert; Vorbrueggen, Helmut; and Elger, Walter, 4,487,953, Cl. 560-55.000.
Vosper, George W. Internal combustion engine having diverter valve and separate passage for purging engine. 4,487,171, Cl. 123-79.00R.
Voth, Elmer D.: *See*—
Mullet, David L.; Rilling, Raymond J.; and Voth, Elmer D., 4,487,007, Cl. 56-16.600.
Vrable, John B., to United States Steel Corporation. Method for decreasing corrosion of internal surfaces of metallic conduit systems. 4,487,672, Cl. 204-148.000.
Vrydags, Andre P. J.: *See*—
Colley, Jacques L. J.; and Vrydags, Andre P. J., 4,487,117, Cl. 99-341.000.
VSI Corporation: *See*—
Chun, Hugh H., 4,487,226, Cl. 138-30.000.
Vuckovich, Michael; Burkett, John P.; and Sallustio, Joseph, to Westinghouse Electric Corp. Transfer of fuel assemblies. 4,487,741, Cl. 376-271.000.
Vyas, Dolatrai M.; Kaneko, Takushi; and Doyle, Terrence W., to Bristol-Myers Company. Amidines. 4,487,769, Cl. 424-246.000.
Vysoka skola chemicko-technologicka: *See*—
Bartuska, Miloslav; Kroupa, Petr; Szabo, Josef; and Zverina, Karel, 4,487,841, Cl. 501-105.000.
Vyzkumny ustav silnoproude elektrotechniky: *See*—
Malek, Zdenek; Jelinek, Stanislav; Belling, Alexandr; Matena, Vladimir; and Jelinek, Jan, 4,487,253, Cl. 165-11.00R.
W. A. Whitney Corp.: *See*—
Scott, William B.; Dickinson, Daniel C.; and Arnesson, Joel C. E., 4,486,941, Cl. 29-568.000.
W. W. Patterson Company: *See*—
Grapes, Eugene F.; and Patterson, W. W., III, 4,487,442, Cl. 294-83.00R.
Wada, Kenichi; and Kubo, Takashige, to Hitachi, Ltd. Data processing system. 4,488,221, Cl. 364-200.000.
Wada, Masaru: *See*—
Shimizu, Hirokazu; Itoh, Kunio; Wada, Masaru; Sugino, Takashi; and Okabe, Takako, 4,488,304, Cl. 372-36.000.
Sugino, Takashi; Itoh, Kunio; Wada, Masaru; Shimizu, Hirokazu; Mizuno, Hiroyuki; and Fujimoto, Kazuo, 4,488,306, Cl. 372-46.000.
Wada, Tomio: *See*—
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Wada, Yasumitsu: *See*—
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Wagner, Kuno: *See*—
Richter, Roland; Muller, Hanns P.; and Wagner, Kuno, 4,487,928, Cl. 544-193.000.
Wagner, Martin D., Jr.; and Mathews, Phillip A., to Challenge Systems, Inc. Method and apparatus for high speed asynchronous serial data transfer. 4,488,226, Cl. 364-200.000.
Wagner, Rudolf, to REMS-WERK Christian Foll und Sohne GmbH & Co. Apparatus, especially portable apparatus, for handling tubular- and/or rod-shaped workpieces or the like. 4,487,305, Cl. 192-129.00A.
Wagner, Theodor M.: *See*—
Koslov, Joshua L.; and Wagner, Theodor M., 4,488,178, Cl. 358-163.000.
Wahl, Hans-Jurgen: *See*—
Gerling, Erich; Schlusnus, Karl-Heinz; and Wahl, Hans-Jurgen, 4,487,070, Cl. 73-609.000.
Wahl, Josef; and Schmidt, Peter, to Robert Bosch GmbH. Method and apparatus for optimizing the operational variables of an internal combustion engine. 4,487,186, Cl. 123-436.000.
Wakatsuki, Goroei; Ohzono, Kohei; and Shibuya, Masanori, to Honda Giken Kogyo Kabushiki Kaisha. Parking lock system for three-wheeled vehicles. 4,487,282, Cl. 180-210.000.
Wakefield, G. Felix; Arnett, James C.; and Yoo, Henry I., to Atlantic Richfield Company. Contact for solar cell. 4,487,989, Cl. 136-256.000.
Wakino, Kikuo; Minai, Kiichi; and Seno, Hiroshi, to Murata Manufacturing Co., Ltd. Continuous firing equipment. 4,487,578, Cl. 432-137.000.
Waldo, David T.; Peterson, James L.; and Grimes, William D., to Shell Oil Company; and Shell Offshore Inc. Weather-resistant and self-draining thread protector. 4,487,228, Cl. 138-96.00T.
Walker, Keith W., to United States Gypsum Company. Sound attenuating partition. 4,487,291, Cl. 181-290.000.
Walker, Robert G., to Industra Products, Inc. Apparatus for coils in lengthy cores. 4,486,947, Cl. 29-734.000.
Walton, Kim L.; and Perzoli, Paul A., to Dow Chemical Company, The. Thermoplastic polymer blend composition and membrane formed therefrom. 4,487,891, Cl. 525-222.000.
Waltrip, Delbert F.: *See*—
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Wang, Chih-Chung, to Duracell Inc. Method for making irregular shaped single crystal particles and the use thereof in anodes for electrochemical cells. 4,487,651, Cl. 156-616.00R.
Wang, Kenneth Y.: *See*—
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Wang, Sang-Yen: *See*—
Davis, Richard A.; Moss, Stanton K.; and Wang, Sang-Yen, 4,488,193, Cl. 360-98.000.
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Ward, Harold R., to Raytheon Company. Radar processor. 4,488,154, Cl. 343-9.00R.
Ward, Stephen W., to NCR Corporation. Method and apparatus for efficient data storage. 4,488,254, Cl. 364-900.000.
Ward, William J., III; Gaines, George L., Jr.; and Ritzer, Alan, to General Electric Company. Method for making methylchlorosilanes. 4,487,950, Cl. 556-472.000.
Warner, Donald F., to Heat Exchanger Industries, Inc. Exhaust gas treatment method and apparatus. 4,487,139, Cl. 110-345.000.
Warren, Craig B.: *See*—
Yoshida, Takao; Katz, Ira; Warren, Craig B.; and Wiener, Charles, 4,487,613, Cl. 48-197.0FM.
Warrin, George E., to Cooper LaserSonics, Inc. Dental cleaning system. 4,487,582, Cl. 433-88.000.
Watanabe, David J., to Union Oil Company of California. Acidizing a subterranean reservoir. 4,487,265, Cl. 166-307.000.
Watanabe, Hiromu: *See*—
Uchikawa, Naoshi; Takahashi, Mineo; and Watanabe, Hiromu, 4,487,560, Cl. 418-55.000.
Watanabe, Isamu; Kamiya, Kazuhiro; and Mori, Toshihito, to Kowa Company, Ltd. 2'-N-β-Lysyl) aminoglycosides. 4,487,924, Cl. 536-16.100.
Watanabe, Jun-ichi; and Aoyama, Takahiko, to Kawasaki Jukogyo Kabushiki Kaisha. Muffler device of motorcycle. 4,487,288, Cl. 181-238.000.
Watanabe, Katsunori: *See*—
Katagiri, Kazuharu; Watanabe, Katsunori; Sakai, Kiyoshi; Ishikawa, Shozo; and Kitahara, Makoto, 4,487,824, Cl. 430-58.000.
Watanabe, Keizo: *See*—
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Watanabe, Kenichi, to Mazda Motor Corporation. Support system for automobile power plant. 4,487,287, Cl. 180-297.000.
Watanabe, Masami, to Kashima Oil Company Limited. Method for producing mesophase-containing pitch by using carrier gas. 4,487,685, Cl. 208-44.000.
Watanabe, Niro; Nemoto, Shiro; Yasujima, Hiroyuki; and Yoshida, Kaneki, to Toppan Printing Co., Ltd. Diazotype heat development recording medium with hydrophobic salt of alkyl substituted guanidine. 4,487,826, Cl. 430-176.000.
Watari, Ryuzo: *See*—
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Watashi, Masahiro: *See*—
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Watson, James C., to PPG Industries, Inc. Glass fibers to reinforce polymeric materials. 4,487,797, Cl. 428-268.000.
Watson, John A., to Lecorp, Inc. Adaptive control for thermal dryer. 4,487,577, Cl. 432-37.000.
Watson, Stuart L., Jr.; and Humphreys, Gordon R., to Union Carbide Corporation. Method of making mixed aliphatic/aromatic polycarbodiimides. 4,487,964, Cl. 564-252.000.
Watts, Philip S.: *See*—
De Vaughn, Donald H.; Watts, Philip S.; Raty, Dallas L.; and Maker, Edward H., II, 4,487,081, Cl. 73-864.130.
Waymouth, John F.: *See*—
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Weaver & Hurt Limited: *See*—
Hurt, John A., 4,487,274, Cl. 173-134.000.
Weaver, John H., to Leigh Instruments Limited. Cassette for strain recorder. 4,487,382, Cl. 242-197.000.
Weaver, Max A., to Eastman Kodak Company. Azo dyes from substituted 3-amino-pyridines with aniline, tetrahydroquinoline and benzomorpholine couplers. 4,487,719, Cl. 260-155.000.
Webasto-Werk W. Baier GmbH & Co.: *See*—
Igel, Richard; Lutz, Alfons; Jardin, Hans; and Srdinko, Klaus-Peter, 4,487,449, Cl. 296-216.000.
Webb, Fred C.; Head, Michael B.; and Cegles, William P., to Corcom, Inc. A.C. Power entry module. 4,488,201, Cl. 361-334.000.

Weber, Jakob; Forster, Josef; and Weber, Robert, to Kraftwerk Union Aktiengesellschaft. Tube lane manipulator. 4,487,165, Cl. 122-392.000.

Weber, Robert: *See*—
Weber, Jakob; Forster, Josef; and Weber, Robert, 4,487,165, Cl. 122-392.000.

Webster, William L.: *See*—
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Wedel, Gregory L., to Beloit Corporation. Magnetic spoiler bar apparatus. 4,486,962, Cl. 34-110.000.

Wedlock, David J.: *See*—
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Wei, Millet L.: *See*—
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Weidler, Charles H., to AMP Incorporated. Method of making two row electrical connector. 4,486,950, Cl. 29-866.000.

Weis, Otto: *See*—
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Weiss, Charles O.; and Emerich, Dwight E., to Drew Chemical Corporation. Oximes as oxygen scavengers. 4,487,745, Cl. 422-16.000.

Weisz, William, to Singer Company, The. Force amplifying arrangement for sewing machine pushbutton control. 4,487,141, Cl. 112-158.00C.

Welbourn, Dale K. Projectile game apparatus. 4,487,419, Cl. 273-343.000.

Welschof Hans-Heinrich, to Lohr & Bromkamp GmbH. Bearing assembly. 4,487,593, Cl. 464-111.000.

Welzhofer, Klaus, to Siemens Aktiengesellschaft. Pulse shaper. 4,488,062, Cl. 307-268.000.

Werding, Winfried J. Thrust control means mountable in a pressurized container. 4,487,334, Cl. 222-55.000.

Wermeister, Gunter, to Santrade Ltd. Mount for milling tool bits. 4,487,533, Cl. 407-105.000.

Wesenberg, Walter: *See*—
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West, David W.; Hazel, Lonnie R.; and Frederick, John M., to Square D Company. Vent assembly and method of making same. 4,487,113, Cl. 98-121.00R.

West, David W.: *See*—
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West Electric Co., Ltd.: *See*—
Ishikawa, Katsuji, 4,487,494, Cl. 354-401.000.

Westcott, Gerald R.: *See*—
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Westinghouse Electric Corp.: *See*—
Bluzer, Nathan; Turley, Alfred P.; Kub, Francis J.; and Borsuk, Gerald M., 4,488,163, Cl. 357-24.000.
Burnham, Walter J., 4,487,090, Cl. 74-798.000.
Dailey, George F.; and Luzader, Homer W., 4,488,079, Cl. 310-260.000.
Gyugyi, Laszlo; and Sarkozi, Miklos, 4,488,216, Cl. 363-160.000.
Hansen, Irvin L.; and Haack, Randall W., 4,488,136, Cl. 336-215.000.
Nasuta, Anthony T.; Boenning, Robert A.; and Kraus, Mark G., 4,488,301, Cl. 371-25.000.
Pope, James M.; Harrison, Dou E.; and Lahoda, Edward J., 4,487,711, Cl. 252-629.000.
Vuckovich, Michael; Burkett, John P.; and Sallustio, Joseph, 4,487,741, Cl. 376-271.000.

Weston, Colin K. Sheet carrier for tractor-feed printers. 4,487,645, Cl. 156-157.000.

Westvaco Corporation: *See*—
Fisher, Harland S.; Gendron, Wilfred H.; and Georgiades, Gregory, 4,487,360, Cl. 229-73.000.

Weyerhaeuser Company: *See*—
Marrs, Gevan R., 4,487,323, Cl. 209-546.000.

White, Donald E., to B. F. Goodrich Company, The. Reduced polymer buildup in condenser of reactor vessel. 4,487,899, Cl. 526-74.000.

White, Robert W.: *See*—
Bianchetta, Donald L.; and White, Robert W., 4,487,255, Cl. 165-39.000.

Whitehurst, Darrell D.: *See*—
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Whittington, James K.: *See*—
Lane, Charles H.; and Whittington, James K., 4,487,990, Cl. 174-15.0WF.

Wiatt, James G.; Calvert, James W.; Belcher, Samuel L.; and Smith, Roger D., to Cincinnati Milacron Inc. Apparatus for high rate production of biaxially oriented thermoplastic articles. 4,487,568, Cl. 425-534.000.

Wick, Albert: *See*—
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Wick, Wilhelm: *See*—
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Wico Corporation: *See*—
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Widdowson, Arnold B., to AT&T Technologies, Inc. Coupling devices for operations such as testing. 4,488,111, Cl. 324-158.00F.

Wiener, Charles: *See*—
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Wiernicki, Michael V., to Facet Enterprises, Incorporated. Low cost electromagnetic fluid pump. 4,487,556, Cl. 417-417.000.

Wiessner, Martin G.: *See*—
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Wiklund, David E.: *See*—
Burlage, Brian J.; Wiklund, David E.; and Lenz, Gary A., 4,487,076, Cl. 73-861.240.

Wilcox, Donald G.; and Zambrano, Nobile, to Show-Pak, Incorporated. Container case. 4,487,328, Cl. 220-241.000.

Wiley, Bruce F., to Phillips Petroleum Company. Determination of the inhibition characteristics of a rock formation. 4,487,056, Cl. 73-38.000.

Wilfong, Jay F. Bead transferring puzzle. 4,487,415, Cl. 273-113.000.

Wilh. Frank GmbH: *See*—
Frank, Wilhelm, 4,486,978, Cl. 49-153.000.

Wilkens, Robert A.; and Robbins, Michael F. Turnbuckle ratchet tightening tool. 4,487,094, Cl. 81-57.390.

Wilkinson, Richard L.; and Vitale, George, to Discovision Associates. Video recorder-playback machine. 4,488,279, Cl. 369-54.000.

Wilkinson Sword Limited: *See*—
Livens, Michael G.; and Adams, James E., 4,487,596, Cl. 493-125.000.

Willems, Johannes J. G. S. A.; van Beek, Johann R. G. C. M.; and Buschow, Kurt H. J. Electrochemical cell comprising stable hydride-forming material. 4,487,817, Cl. 429-27.000.

William H. Rorer, Inc.: *See*—
Studt, William L.; Riley, Richard L.; and Douglas, George H., 4,487,779, Cl. 424-278.000.

Williams, Robert H. Oscillating piston diesel engine. 4,487,167, Cl. 123-18.00R.

Willingham, Wendell D., to Owens-Illinois, Inc. Crown closures and containers. 4,487,325, Cl. 215-307.000.

Wilson, Jesse R.: *See*—
Bolton, Brent C.; Logsdon, Gary L.; Hagenmaier, Carl F., Jr.; and Wilson, Jesse R., 4,488,151, Cl. 340-825.500.

Wilson, Joe C.; and Davis, Pauls, to BASF Wyandotte Corporation. Gelation stabilized water-soluble silicates. 4,487,712, Cl. 252-78.300.

Winfred M. Berg, Inc.: *See*—
Berg, Dennis G., 4,487,591, Cl. 464-85.000.

Wingate, Sidney A.: *See*—
Aronson, Herbert L.; Wingate, Sidney A.; Cotter, William L.; and Brisk, Richard A., 4,488,237, Cl. 364-476.000.

Wink Corporation: *See*—
Stewart, Robert T., 4,487,314, Cl. 206-216.000.

Wink, Randall: *See*—
Fuchs, Gilbert; Crowley, Norman; and Wink, Randall, 4,487,132, Cl. 104-166.000.

Winkelmann, Adalbert, to Verdol S.A. Spindle cap having a variable moment of resistance. 4,487,009, Cl. 57-58.860.

Winner, Peter P.; and Woo, James T. K., to SCM Corporation. Aqueous self-curing polymeric blends. 4,487,860, Cl. 523-408.000.

Winner, Peter P., to SCM Corporation. Aqueous polymeric blends. 4,487,861, Cl. 523-428.000.

Winstead, Thomas W., to Maryland Cup Corporation. Tamper-evident closure. 4,487,329, Cl. 220-276.000.

Wirnowski, Richard C., to Exxon Research & Engineering Co. Electrosensitive recording medium. 4,488,158, Cl. 346-135.100.

Wischermann, Gerhard, to Robert Bosch GmbH. Digital filter. 4,488,251, Cl. 364-724.000.

Withnall, Malcolm D. N.; Pemberton, Martin J.; and McManus, Kevin, to DCA Design Consultants Limited. Through-ticketing in a passenger transport system. 4,488,035, Cl. 235-384.000.

Wojnarowski, Robert J.: *See*—
Eichelberger, Charles W.; and Wojnarowski, Robert J., 4,487,811, Cl. 428-546.000.

Wolf, Hans; and Lenhart, Richard, to Hoechst Aktiengesellschaft. Shirred tubular casing and apparatus including shirring member for its manufacture. 4,487,231, Cl. 138-118.100.

Wolf, Karl, to Alcotek, Inc. Breath alcohol testing device. 4,487,055, Cl. 73-23.000.

Wolfbeiss, Erich: *See*—
Stiefel, Max; and Wolfbeiss, Erich, 4,487,740, Cl. 376-256.000.

Wolkstein, Herbert J., to RCA Corporation. Method and apparatus for compensating non-linear phase shift through an RF power amplifier. 4,488,122, Cl. 330-149.000.

Wollman, Herbert, to Analogic Corporation. High linearity digital to analog converter. 4,488,144, Cl. 340-347.0DA.

Woltjen, Duane W.: *See*—
Sunnen, Robert M.; and Woltjen, Duane W., 4,486,983, Cl. 51-347.000.

Woo, James T. K.: *See*—
Winner, Peter P.; and Woo, James T. K., 4,487,860, Cl. 523-408.000.

Woodward, Thomas D.: *See*—
Worsley, Gail G.; and Woodward, Thomas D., 4,487,013, Cl. 59-84.000.

Worcester Controls Corporation: *See*—
Prince, Brian E., 4,487,111, Cl. 92-110.000.

Workman, Wesley E.: *See*—
Day, Donal F.; and Workman, Wesley E., 4,487,831, Cl. 435-99.000.

Worsley, Gail G.; and Woodward, Thomas D., to Agri-Chain Products, Inc. T-rod chain. 4,487,013, Cl. 59-84.000.

Wrhen, Wilmer C., to United States Steel Corporation. Method and apparatus for adjusting the size of a continuous casting mold. 4,487,249, Cl. 164-452.000.
Wright, Dolph D.: *See*—
Perry, James C.; and Wright, Dolph D., 4,487,367, Cl. 239-112.000.
Wu, Chialin, to United States of America, National Aeronautics and Space Administration. Method and apparatus for self-calibration and phasing of array antenna. 4,488,155, Cl. 343-376.000.
Wurfel, Helmut, to Gfk Gesellschaft fur Kohleverflussigung mbH. Process for hydrogenation of coal. 4,487,684, Cl. 208-10.000.
Wurst, Bert: *See*—
Fellhauer, Michael; Holzinger, Otto; Vits, Klaus; and Wurst, Bert, 4,488,299, Cl. 371-20.000.
Wurst, William R.: *See*—
Dienes, Larry E.; Knight, David J.; and Wurst, William R., 4,487,617, Cl. 55-163.000.
Xerox Corporation: *See*—
Baldwin, LeRoy A., 4,487,407, Cl. 271-233.000.
Fischbeck, Kenneth H., 4,487,662, Cl. 204-15.000.
Gruber, Robert J.; and Knapp, John F., 4,487,825, Cl. 430-106.600.
Repp, Thomas J.; and Rebres, Robert P., 4,487,506, Cl. 355-14.0SH.
Xicor, Inc.: *See*—
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Yakushiji, Hisao: *See*—
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Yamabe, Masaaki; Kojima, Gen; and Akiyama, Katsuyuki, to Asahi Glass Company Ltd. Process for producing carboxyl group-containing fluoropolymer. 4,487,893, Cl. 525-386.000.
Yamada, Yasuaki: *See*—
Ozawa, Toshiaki; Yamada, Yasuaki; and Kondo, Hiroatsu, 4,487,517, Cl. 400-279.000.
Yamada, Yasuyoshi: *See*—
Nakano, Shigeki; Yamada, Yasuyoshi; and Hiraga, Ryozo, 4,487,505, Cl. 356-400.000.
Yamaguchi, Akio: *See*—
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Yamaguchi, Elaine S.; and Liston, Thomas V., to Chevron Research Company. Lubricating oil compositions containing an overbased calcium sulfonate and a zinc cyclic hydrocarbyl dithiophosphate-succinimide complex. 4,487,704, Cl. 252-33.400.
Yamamichi, Masayoshi: *See*—
Toyoda, Yasuhiro; Suzuki, Masayuki; and Yamamichi, Masayoshi, 4,487,492, Cl. 354-234.100.
Yamamoto, Hiromi; and Okumura, Takeo, to Kao Soap Co., Ltd. Hair cosmetics. 4,487,760, Cl. 424-70.000.
Yamamoto, Kaichi, to Sony Corporation. Digital chromakey apparatus. 4,488,169, Cl. 358-22.000.
Yamamoto, Kazuhiro; and Atobe, Masaaki, to Nippon Electric Co., Ltd. Time division multiple access system for transmitting an analog signal by the use of bursts without substantial interruption. 4,488,296, Cl. 370-104.000.
Yamamoto, Kazumasa: *See*—
Takeda, Takashi; Yamamoto, Osamu; Murata, Kousaku; and Yamamoto, Kazumasa, 4,487,877, Cl. 524-413.000.
Yamamoto, Kenji: *See*—
Furukawa, Shunsuke; and Yamamoto, Kenji, 4,488,225, Cl. 364-200.000.
Yamamoto, Kiyonori: *See*—
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Takeda, Takashi; Yamamoto, Osamu; Murata, Kousaku; and Yamamoto, Kazumasa, 4,487,877, Cl. 524-413.000.
Yamamoto, Toshihiko: *See*—
Kimura, Hiroshi; Hisajima, Masahiko; Morimoto, Kiyoshi; Shibata, Kiyoshi; Nagashima, Takashi; Yoshikawa, Yasuhiko; Watashi, Masahiro; Yamamoto, Kiyonori; Yamamoto, Toshihiko; and Yoshinaga, Shinsuke, 4,487,497, Cl. 355-8.000.
Yamamuro, Sigeaki: *See*—
Morimoto, Yoshiro; Yamamuro, Sigeaki; Hirano, Hiroyuki; and Tanaka, Yoshikazu, 4,487,302, Cl. 192-4.00A.
Yamamuro, Toshikazu: *See*—
Shiotsubo, Masami; Yamamuro, Toshikazu; and Saito, Hiroshi, 4,487,525, Cl. 405-184.000.
Yamanaka, Hideaki: *See*—
Takaya, Takao; Takasugi, Hisashi; Masugi, Takashi; Yamanaka, Hideaki; and Kawabata, Kohji, 4,487,927, Cl. 544-22.000.
Yamataka, Kazunori: *See*—
Shimizu, Atsushi; and Yamataka, Kazunori, 4,487,752, Cl. 423-507.000.
Yamatani, Yoshiichi. Swivel joint. 4,487,435, Cl. 285-94.000.
Yamato Scale Company, Ltd.: *See*—
Oshima, Yasushi; and Omae, Michinobu, 4,487,338, Cl. 222-196.000.
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Suzuki, Shigeru; Koizumi, Yutaka; Yanagawa, Nobuyuki; Hirakura, Koji; and Imai, Chikara, 4,487,501, Cl. 355-50.000.
Yanagisawa, Masayasu, to Greenterior Co., Ltd., The. Hydroponic pet feeding device. 4,487,164, Cl. 119-51.500.
Yanagiuchi, Yukihiro; Hirota, Eiichi; Sakakima, Hiroshi; and Senno, Harufumi, to Matsushita Electric Industrial Co., Ltd. Magnetic head and method of producing same. 4,488,195, Cl. 360-125.000.
Yang, Yung-hsiung: *See*—
Tominaga, Michiaki; Yang, Yung-hsiung; Ogawa, Hidenori; and Nakagawa, Kazuyuki, 4,487,772, Cl. 424-250.000.
Yarnell, Ian R. Device and method for removing irregularities in or enlarging an underground duct. 4,487,052, Cl. 72-393.000.
Yaskawa Electric Mfg. Co., Ltd.: *See*—
Matsumoto, Kenichi; Goto, Mashakatsu; Yomura, Kiyoshi; Otsuka, Masao; Hori, Koichi; and Okamura, Yoshiyuki, 4,488,023, Cl. 200-147.00R.
Yasuda, Hiroshi; and Ban, Yasutaka, to Fujitsu Limited. Method of forming patterned conductor lines. 4,487,795, Cl. 428-138.000.
Yasujima, Hiroyuki: *See*—
Watanabe, Niro; Nemoto, Shiro; Yasujima, Hiroyuki; and Yoshida, Kaneki, 4,487,826, Cl. 430-176.000.
Yavnieli, Mordechai, to Amcor Ltd. Insect electrocution device. 4,486,974, Cl. 43-112.000.
Yoko, Kusakabe; and Taku, Mizuno, to Kaken Chemical Co. Ltd. Antibiotic 5057B substance. 4,487,762, Cl. 424-120.000.
Yokoyama, Hiroshi; and Ishida, Tokuzi, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Air-fuel mixture intake apparatus for internal combustion engines. 4,487,185, Cl. 123-432.000.
Yomura, Kiyoshi: *See*—
Matsumoto, Kenichi; Goto, Mashakatsu; Yomura, Kiyoshi; Otsuka, Masao; Hori, Koichi; and Okamura, Yoshiyuki, 4,488,023, Cl. 200-147.00R.
Yomura, Yoshinori: *See*—
Hara, Tomihiro; Kagechika, Hiroshi; Doi, Satoshi; and Yomura, Yoshinori, 4,487,663, Cl. 204-27.000.
Yon, Carmen M., to Union Carbide Corporation. Adsorption separation cycle. 4,487,614, Cl. 55-33.000.
Yoneda, Kenichi: *See*—
Onojima, Yoshio; Yoneda, Kenichi; Kamimura, Yoshihiko; Shimada, Akira; and Noguchi, Masahiko, 4,487,748, Cl. 423-240.000.
Yoo, Henry I.: *See*—
Wakefield, G. Felix; Arnett, James C.; and Yoo, Henry I., 4,487,989, Cl. 136-256.000.
Yoshida, Kaneki: *See*—
Watanabe, Niro; Nemoto, Shiro; Yasujima, Hiroyuki; and Yoshida, Kaneki, 4,487,826, Cl. 430-176.000.
Yoshida Kogyo K. K.: *See*—
Hatta, Keiso, 4,487,373, Cl. 242-16.000.
Yoshida Kogyo, K.K.: *See*—
Gartner, Karl, 4,486,992, Cl. 52-235.000.
Yoshida, Takao; Katz, Ira; Warren, Craig B.; and Wiener, Charles, to International Flavors & Fragrances Inc. Odorization of combustible hydrocarbon gases. 4,487,613, Cl. 48-197.0FM.
Yoshikawa, Yasuhiko: *See*—
Kimura, Hiroshi; Hisajima, Masahiko; Morimoto, Kiyoshi; Shibata, Kiyoshi; Nagashima, Takashi; Yoshikawa, Yasuhiko; Watashi, Masahiro; Yamamoto, Kiyonori; Yamamoto, Toshihiko; and Yoshinaga, Shinsuke, 4,487,497, Cl. 355-8.000.
Yoshimura, Yoshikazu, to Matsushita Electric Industrial Co., Ltd. Resonant cavity with dielectric resonator for frequency stabilization. 4,488,124, Cl. 331-107.0DP.
Yoshinaga, Shinsuke: *See*—
Kimura, Hiroshi; Hisajima, Masahiko; Morimoto, Kiyoshi; Shibata, Kiyoshi; Nagashima, Takashi; Yoshikawa, Yasuhiko; Watashi, Masahiro; Yamamoto, Kiyonori; Yamamoto, Toshihiko; and Yoshinaga, Shinsuke, 4,487,497, Cl. 355-8.000.
Yoshioka, Yasuhiko: *See*—
Sakuta, Masaharu; Kiya, Soichi; Uchizaki, Iwao; Yoshioka, Yasuhiko; Ito, Koichi; Saito, Toshio; Kaya, Tadahiro; Shioya, Tsunetoshi; and Shimoyama, Yoshifumi, 4,487,633, Cl. 106-90.000.
Yoshitsugu, Seikichi: *See*—
Kagitani, Kazuhiro; Yoshitsugu, Seikichi; and Mizusawa, Akira, 4,486,985, Cl. 52-127.700.
Yoshizumi, Toshiaki, to Mitsubishi Denki Kabushiki Kaisha. Gas insulated disconnector. 4,488,021, Cl. 200-144.0AP.
Yoshizumi, Toshiaki, to Mitsubishi Denki Kabushiki Kaisha. Mechanism for adjusting the speed of displacement of an arc contact for a switching apparatus. 4,488,022, Cl. 200-146.00R.
Yoshizumi, Toshihiko: *See*—
Koike, Masaru; Hasegawa, Yasumasa; Shimosaka, Satoru; Aoyama, Nagara; and Yoshizumi, Toshihiko, 4,486,963, Cl. 34-116.000.
Young, Alastair J., to Automotive Products plc. Control system for a fluid pressure engaged clutch. 4,487,304, Cl. 192-85.00R.
Young, Curtis H., Jr.: *See*—
Shirey, Thomas F.; Serviss, William C.; and Young, Curtis H., Jr., 4,488,110, Cl. 324-133.000.
Young, Dennis: *See*—
Heyward, Malcolm P.; and Young, Dennis, 4,487,851, Cl. 518-728.000.
Telford, Clive D.; and Young, Dennis, 4,487,843, Cl. 502-85.000.
Young, Frederick A.; Ahulii, Robert J.; and Rikimaru, Roy K., to Hughes Aircraft Company. Microwave integrated circuit, bandpass filter. 4,488,130, Cl. 333-203.000.
Young, Frederick A.: *See*—
Griffin, Edward L.; Endler, Harvey M.; and Young, Frederick A., 4,488,131, Cl. 333-205.000.

Yu, Kin C.; and Goss, Gary J., to Honeywell Information Systems Inc. Communication multiplexer having dual microprocessors. 4,488,231, Cl. 364-200.000.

Yuan, Ham-Tzong: *See*—
Lam, Hon W.; and Yuan, Ham-Tzong, 4,487,639, Cl. 148-175.000.

Zagranski, Raymond D.: *See*—
Morrison, Terry; Howlett, James J.; and Zagranski, Raymond D., 4,488,236, Cl. 364-442.000.

Zalewski, Jack J.; and Theurer, Walter C., to Eaton Corporation. Miniature multi-pole double-throw snap-action pushbutton switch with alpha-numeric display. 4,488,120, Cl. 200-76.000.

Zambrano, Nobile: *See*—
Wilcox, Donald G.; and Zambrano, Nobile, 4,487,328, Cl. 220-241.000.

Zanzig, Jurgen: *See*—
Eschmann, Joachim; and Zanzig, Jurgen, 4,488,291, Cl. 370-62.000.

Zappen, Hans-W.; Poetsch, Dieter; Lehmann, Klaus; Zimmermann, Friedrich; and Muller, Klaus D., to Robert Bosch GmbH. Method and system to reduce low-frequency noise in semiconductor sensors. 4,488,052, Cl. 250-578.000.

Zawacki, Thomas S.: *See*—
Macrisa, Robert A.; and Zawacki, Thomas S., 4,487,027, Cl. 62-112.000.

Zayats, Alexandr A.: *See*—
Danchenko, Valentin N.; Zayats, Alexandr A.; Potapov, Ivan N.; Finagin, Petr M.; and Kutsenko, Sergei P., 4,487,049, Cl. 72-208.000.

Zegar, Michael A. Golf bag and carrying device. 4,487,347, Cl. 224-259.000.

Zegarski, Ronald J.: *See*—
Rork, Gerald D.; Thorp, Edward J.; and Zegarski, Ronald J., 4,488,044, Cl. 250-381.000.

Ziegler, Donald H. Wall mounted device for supporting articles. 4,487,389, Cl. 248-282.000.

Ziegler, Georg, to Sulzer Brothers Limited. Gas cooler for a synthetic gas. 4,487,611, Cl. 48-69.000.

Ziegler, Hans J. Telephone pedestal encapsulating splice housing. 4,488,013, Cl. 179-175.10R.

Zimmerman, Robert L.; and Dominguez, Richard J. G., to Texaco Inc. Reaction injection molded elastomers containing acid amides. 4,487,912, Cl. 528-52.000.

Zimmerman, William T., to Du Pont de Nemours, E. I., and Company. Herbicidal sulfonamides. 4,487,626, Cl. 71-90.000.

Zimmermann, Friedrich: *See*—
Zappen, Hans-W.; Poetsch, Dieter; Lehmann, Klaus; Zimmermann, Friedrich; and Muller, Klaus D., 4,488,052, Cl. 250-578.000.

Zison, Stanley W., to Getty Synthetic Fuels, Inc. Method for projecting landfill gas collection rate of a surface collector. 4,487,054, Cl. 73-19.000.

Zolnowsky, John E.; Keshlear, William M.; and Crisp, Richard D., to Motorola, Inc. Memory management unit having means for detecting and preventing mapping conflicts. 4,488,256, Cl. 364-900.000.

Zolnowsky, John E.: *See*—
Crudele, Lester M.; Zolnowsky, John E.; Moyer, William C.; and MacGregor, Douglas B., 4,488,228, Cl. 364-200.000.

Zordan, Richard D.: *See*—
Crook, Paul; and Zordan, Richard D., 4,487,630, Cl. 75-123.00B.

Zuk, Borys, to RCA Corporation. Timing circuit. 4,487,125, Cl. 102-220.000.

Zulauf, Herbert, to Swiss Aluminium Ltd. Wheel disc cast in situ with interlocking rim. 4,487,456, Cl. 301-63.00R.

Zverina, Karel: *See*—
Bartuska, Miloslav; Kroupa, Petr; Szabo, Josef; and Zverina, Karel, 4,487,841, Cl. 501-105.000.

Zwart, Klaas. Device for temporarily sealing a pipe. 4,487,221, Cl. 137-508.000.

Zweifel, Hans; Schilling, Walter; Storni, Angelo; and Bellus, Daniel, to Ciba-Geigy Corporation. 6,7-Dihydro-5H-benzocycloheptene-8,9-dicarboxylic acid anhydrides. 4,487,942, Cl. 549-236.000.

Zymark Corporation: *See*—
Hutchins, Burleigh M.; and Abrahams, Louis, 4,488,241, Cl. 364-513.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 11TH DAY OF DECEMBER, 1984

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A/S Haustrup Plastic: *See*—
Ingemann, Ole, Re. 31,759, Cl. 220-266.000.

American Can Company: *See*—
Vosti, Donald C.; and Silverman, Alan, Re. 31,762, Cl. 426-111.000.

Boehringer Ingelheim GmbH: *See*—
Voss, Gunther; and Gruber, Peter, Re. 31,764, Cl. 427-3.000.

Chemplex Company: *See*—
Dombro, Robert A.; and Kirch, William, Re. 31,761, Cl. 502-236.000.

Dombro, Robert A.; and Kirch, William, to Chemplex Company. Method of preparing zirconia-silica xerogels, the xerogels, and xerogel catalysts. Re. 31,761, Cl. 502-236.000.

Gruber, Peter: *See*—
Voss, Gunther; and Gruber, Peter, Re. 31,764, Cl. 427-3.000.

Guibert, Raul, to Sunset Ltd. Counter-top oven. Re. 31,765, Cl. 219-400.000.

Hodge, Dean E.: *See*—
Skoch, Leroy V.; and Hodge, Dean E., Re. 31,763, Cl. 426-658.000.

Ingemann, Ole, to A/S Haustrup Plastic. Container with lid opening means. Re. 31,759, Cl. 220-266.000.

Kassai Kabushikikaisha: *See*—
Kassai, Kenzou, Re. 31,760, Cl. 280-644.000.

Kassai, Kenzou, to Kassai Kabushikikaisha. Baby carriage. Re. 31,760, Cl. 280-644.000.

Kirch, William: *See*—
Dombro, Robert A.; and Kirch, William, Re. 31,761, Cl. 502-236.000.

Miles Laboratories, Inc.: *See*—
White, James A., Re. 31,766, Cl. 307-494.000.

Ralston Purina Company: *See*—
Skoch, Leroy V.; and Hodge, Dean E., Re. 31,763, Cl. 426-658.000.

Silverman, Alan: *See*—
Vosti, Donald C.; and Silverman, Alan, Re. 31,762, Cl. 426-111.000.

Skoch, Leroy V.; and Hodge, Dean E., to Ralston Purina Company. Animal feed block containing magnesium oxide. Re. 31,763, Cl. 426-658.000.

Sunset Ltd.: *See*—
Guibert, Raul, Re. 31,765, Cl. 219-400.000.

Voss, Gunther; and Gruber, Peter, to Boehringer Ingelheim GmbH. Pharmaceuticals having dotted active ingredients and a method and apparatus for the preparation thereof. Re. 31,764, Cl. 427-3.000.

Vosti, Donald C.; and Silverman, Alan, to American Can Company. Container. Re. 31,762, Cl. 426-111.000.

White, James A., to Miles Laboratories, Inc. Sensor integrator system. Re. 31,766, Cl. 307-494.000.

LIST OF DESIGN PATENTEES

A A Electronics (International) Limited: *See*—
Au, Ser K., 276,703, Cl. D10-15.000.

Adams, Danny C.: *See*—
Eads, Harold O.; Fowler, Ronald R.; and Adams, Danny C., 276,755, Cl. D34-26.000.

Adams, Gary A.: *See*—
Entenmann, Charles E.; Adams, Gary A.; and Dewel, Steven L., 276,702, Cl. D9-456.000.

Akasaki, Hidehiko: *See*—
Sugimoto, Masahiro; Akasaki, Hidehiko; and Wakabayashi, Tetsushi, 276,719, Cl. D13-99.000.

American Cyanamid Company: *See*—
Mansau, Serge, 276,699, Cl. D9-403.000.

Appel, Mel; and Kress, George, to Appel, Mel. Toy dressing table. 276,741, 12-11-84, Cl. D21-121.000.

Au, Ser K., to A A Electronics (International) Limited. Electronic clock. 276,703, 12-11-84, Cl. D10-15.000.

Bachmann, G. Merle; Davis, Charles L.; and Morgan, Annis R., Jr., to Coca-Cola Company, The. Vending machine. 276,735, 12-11-84, Cl. D20-5.000.

Beaver, Bryan. Lamp fixture. 276,750, 12-11-84, Cl. D26-73.000.

Benedict, Mellen-Thomas. Handle for glass cutter or the like. 276,694, 12-11-84, Cl. D8-107.000.

Bisker, Richard G.: *See*—
Todd, John A.; and Bisker, Richard G., 276,726, Cl. D15-9.200.

Bonnefoy, Francis, to Posso S.A. Slide viewer. 276,729, 12-11-84, Cl. D16-17.000.

Brio Toy AB: *See*—
Petersson, Nils A. I.; and Sander, Nils B. L., 276,669, Cl. D6-335.000.

Brown, John M.; Herritz, Donald; and Westmas, Leland D., to Gerber Products Company. Combined hood and collar assembly. 276,700, 12-11-84, Cl. D9-436.000.

Brunger, Ronald N.; Nicklin, Lawrence G.; and Harris, Charles W., to International Harvester Co. Motor vehicle cab. 276,710, 12-11-84, Cl. D12-96.000.

Bryant, Edward V. Sports cap. 276,666, 12-11-84, Cl. D2-244.000.

Carlson, Arthur R. Bottle. 276,698, 12-11-84, Cl. D9-372.000.

Channel-Kor Systems Inc.: *See*—
Miller, Melvin M., 276,677, Cl. D6-471.000.
Miller, Melvin M., 276,678, Cl. D6-471.000.
Miller, Melvin M., 276,679, Cl. D6-471.000.
Miller, Melvin M., 276,680, Cl. D6-471.000.

Clivio, Franco; and Raffler, Dieter, to Gardena Kress and Kastner GmbH. Sprinkler. 276,743, 12-11-84, Cl. D23-7.000.

Coca-Cola Company, The: *See*—
Bachmann, G. Merle; Davis, Charles L.; and Morgan, Annis R., Jr., 276,735, Cl. D20-5.000.

Cone Mills Corporation: *See*—
Tornero, Rogelio; and Terraneo, Mario, 276,670, Cl. D6-360.000.

Coppage, Sandra L.: *See*—
Portwood, Presley H.; Simmons, Philip N.; and Coppage, Sandra L., 276,664, Cl. D2-208.000.

Crim, Phillip A.: *See*—
Maza, Dale T.; Hawkins, Larry S.; Dolphin, Gary A., Sr.; and Crim, Phillip A., 276,753, Cl. D34-11.000.

Dart Industries Inc.: *See*—
Goodin, John W.; and Patterson, Charlie A., 276,718, Cl. D13-12.000.
Spoeth, Carl R., Jr., 276,689, Cl. D7-355.000.

Daugherty, Valerie, to Questor Corp. Toy dog teether. 276,738, 12-11-84, Cl. D21-65.000.

Davis, Charles L.: *See*—
Bachmann, G. Merle; Davis, Charles L.; and Morgan, Annis R., Jr., 276,735, Cl. D20-5.000.

Davis, Gregg M.: *See*—
Krueck, John F.; and Davis, Gregg M., 276,758, Cl. D34-34.000.

Dewel, Steven L.: *See*—
Entenmann, Charles E.; Adams, Gary A.; and Dewel, Steven L., 276,702, Cl. D9-456.000.

Dignan, Donald J., to Eastern Company, The. Folding step. 276,716, 12-11-84, Cl. D12-203.000.

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Duncan, Clarence R., Jr. Game table. 276,676, 12-11-84, Cl. D6-425.000.

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Hamatani, George. Wand with angularly adjustable magnetic end for retrieving small remote ferromagnetic objects. 276,690, 12-11-84, Cl. D8-14.000.

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534 4,487,021
547.1 4,487,022

CLASS 62
1 4,487,023
3 4,487,024
4,487,619
54 4,487,025
101 4,487,026
112 4,487,027
115 4,487,028
133 4,487,029
141 4,487,030
160 4,487,031
183 4,487,032
373 4,487,033
402 4,487,034
406 4,487,035
474 4,487,036
514 R 4,487,037
515 4,487,038

CLASS 65
4.4 4,487,622
21.3 4,487,620
27 4,487,621
106 4,487,623

CLASS 66
84 A 4,487,039
195 4,487,040

CLASS 69
1 4,487,041

CLASS 70
186 4,487,042
312 4,487,043

CLASS 71
32 4,487,624
77 4,487,625
90 4,487,626

CLASS 72
8 4,487,044
43 4,487,045
52 4,487,046
88 4,487,047
94 4,487,048
208 4,487,049
243 4,487,050
312 4,487,051
335 4,487,053
393 4,487,052

CLASS 73
19 4,487,054
23 4,487,055
38 4,487,056
40.5 R 4,487,057
40.7 4,487,058
116 4,487,059
129 4,487,060
151 4,487,061
202 4,487,062
204 4,487,063
253 4,487,064
290 V 4,487,065
304 C 4,487,066
432 R 4,487,067
587 4,487,068
606 4,487,069
609 4,487,070
612 4,487,071
622 4,487,072
626 4,487,073
708 4,487,074
861.05 4,487,075
861.24 4,487,076
861.58 4,487,077
862.06 4,487,078
862.52 4,487,079
863.83 4,487,080
864.13 4,487,081
864.55 4,487,082

CLASS 74
5.46 4,487,083
10.33 4,487,084
113 4,487,085
198 4,487,086
424.8 A 4,487,087
462 4,487,088
531 4,487,089
798 4,487,090
805 4,487,091

CLASS 75
0.5 BA 4,487,627
10 R 4,487,628
84.4 4,487,629
123 B 4,487,630

CLASS 81
57.18 4,487,092
57.37 4,487,093
57.39 4,487,094
4,487,095
121 A 4,487,096

CLASS 83
56 4,487,097

CLASS 84
1.03 4,487,098
1.26 4,487,099
299 4,487,100
462 4,487,101

CLASS 89
1.55 4,487,102
33.02 4,487,103
34 4,487,104

CLASS 91
369 A 4,487,105
436 4,487,106
471 4,487,107
504 4,487,108
506 4,487,109

CLASS 92
93 4,487,110
110 4,487,111

CLASS 98
71 4,487,112
121 R 4,487,113

CLASS 99
295 4,487,114
327 4,487,115
339 4,487,116
341 4,487,117
348 4,487,118
487 4,487,119

CLASS 100
40 4,487,120

CLASS 101
93.14 4,487,121
153 4,487,122
216 4,487,123
4,487,124

CLASS 102
220 4,487,125
229 4,487,126
253 4,487,127
261 4,487,128
313 4,487,129
476 4,487,130
523 4,487,131

CLASS 104
166 4,487,132

CLASS 105
224.1 4,487,133

CLASS 106
80 4,487,631
85 4,487,632
90 4,487,633
203 4,487,634

CLASS 108
44 4,487,134
50 4,487,135
51.3 4,487,136

CLASS 110
160 4,487,137
269 4,487,138
345 4,487,139

CLASS 112
79 R 4,487,140
158 C 4,487,141
168 4,487,142
256 4,487,143
260 4,487,144
320 4,487,145

CLASS 114
102 4,487,146
104 4,487,147
106 4,487,148
144 E 4,487,149
264 4,487,150
266 4,487,151
274 4,487,152
312 4,487,153

CLASS 116
34 B 4,487,154
70 4,487,155
239 4,487,156

CLASS 118
59 4,487,157
60 4,487,158
418 4,487,159
421 4,487,160
723 4,487,161
4,487,162

CLASS 119
1 4,487,163
51.5 4,487,164

CLASS 122
392 4,487,165
406 ST 4,487,166

CLASS 123
18 R 4,487,167
4,487,168
41.33 4,487,169
59 PC 4,487,170
79 R 4,487,171
81 C 4,487,172
179 J 4,487,173
4,487,174
193 H 4,487,175
204 4,487,176
260 4,487,177
276 4,487,178
307 4,487,179
333 4,487,180
357 4,487,181
383 4,487,182
418 4,487,183
425 4,487,184
432 4,487,185
436 4,487,186
478 4,487,187
491 4,487,188
4,487,189
492 4,487,190
652 4,487,191
654 4,487,192

CLASS 126
58 4,487,193
67 4,487,194
77 4,487,195
438 4,487,196
901 4,487,197

CLASS 127
46.3 4,487,198

CLASS 128
25 R 4,487,199
80 C 4,487,200
134 4,487,201
158 4,487,202
303 R 4,487,203
325 4,487,204
326 4,487,205
667 4,487,206
728 4,487,207
736 4,487,208
754 4,487,209
785 4,487,210

CLASS 132
45 R 4,487,211

CLASS 135
90 4,487,212

CLASS 136
213 4,488,269
256 4,487,989

CLASS 137
2 4,487,213
43 4,487,215
72 4,487,214
74 4,487,216
110 4,487,217
355.26 4,487,218
362 4,487,219
375 4,487,220
508 4,487,221
516.29 4,487,222
561 R 4,487,223
569 4,487,224
625.22 4,487,225

CLASS 138
30 4,487,226
37 4,487,227
96 T 4,487,228
4,487,229
103 4,487,230
118.1 4,487,231
122 4,487,232

CLASS 139
28 4,487,233
196.1 4,487,234
370.2 4,487,235
435 4,487,236

CLASS 141
39 4,487,237
206 4,487,238

CLASS 144
193 A 4,487,239
230 4,487,240

CLASS 148
1.5 4,487,635
6.1 4,487,636
6.3 4,487,637
24 4,487,638
175 4,487,639
4,487,640

CLASS 152
428 4,487,241

CLASS 156
54 4,487,641
77 4,487,642
80 4,487,643
89 4,487,644
157 4,487,645
177 4,487,646
181 4,487,647
227 4,487,648
293 4,487,649
567 4,487,650
616 R 4,487,651
643 4,487,652
644 4,487,653
645 4,487,654

CLASS 160
102 4,487,242
168 4,487,243
283 4,487,244
313 4,487,245

CLASS 162
5 4,487,655
73 4,487,656
158 4,487,657

CLASS 164
32 4,487,246
126 4,487,247
131 4,487,248
452 4,487,249
473 4,487,250
475 4,487,251

CLASS 165
7 4,487,252
11 R 4,487,253
16 4,487,254
39 4,487,255
76 4,487,256

CLASS 166

60 4,487,257
120 4,487,258
228 4,487,259
259 4,487,260
264 4,487,261
271 4,487,262
289 4,487,263
300 4,487,264
307 4,487,265

CLASS 169

51 4,487,266

CLASS 172

310 4,487,267
316 4,487,268
818 4,487,269

CLASS 173

12 4,487,270
29 4,487,271
48 4,487,272
55 4,487,273
134 4,487,274

CLASS 174

15 WF 4,487,990
25 R 4,487,991
28 4,487,660
36 4,487,992
52 S 4,487,999
68.5 4,487,993
73 R 4,487,994
74 R 4,487,995
105 R 4,487,996
115 4,487,997
153 G 4,487,998

CLASS 175

170 4,487,275

CLASS 177

1 4,487,276
25 4,487,277
4,487,278
212 4,487,279
4,487,280

CLASS 178

18 4,488,000
22.09 4,488,001

CLASS 179

2 C 4,488,003
2 DP 4,488,002
18 AD 4,488,004
18 B 4,488,005
81 B 4,488,007
81 R 4,488,006
4,488,008
100 D 4,488,009
110 A 4,488,010
115.5 R 4,488,012
175.1 R 4,488,013
175.11 4,488,011

CLASS 180

148 4,487,281
210 4,487,282
219 4,487,283
4,487,284
228 4,487,285
235 4,487,286
297 4,487,287

CLASS 181

238 4,487,288
252 4,487,289
256 4,487,290
290 4,487,291

CLASS 182

234 4,487,292

CLASS 187

29 R 4,487,293

CLASS 188

72.6 4,487,295
73.38 4,487,296
73.45 4,487,297
77 R 4,487,294
79.5 GE 4,487,298
313 4,487,299
378 4,487,300

CLASS 191

12.2 R 4,488,014
45 A 4,488,015

CLASS 192

0.052 4,487,303
4 A 4,487,301
4,487,302
85 R 4,487,304
129 A 4,487,305

CLASS 194

4 C 4,487,306

CLASS 198

394 4,487,307
412 4,487,308
491 4,487,309
524 4,487,310

CLASS 200

5 A 4,488,016
5 R 4,488,017
6 R 4,488,018
61.42 4,488,019
76 4,488,020
144 AP 4,488,021
146 R 4,488,022
147 R 4,488,023
330 4,488,024

CLASS 202

172 4,487,659

CLASS 204

1 T 4,487,661
15 4,487,662
27 4,487,663
44.3 4,487,664
47 4,487,665
56 R 4,487,666
59 R 4,487,667
98 4,487,668
101 4,487,669
129 4,487,670
129.1 4,487,671
148 4,487,672
181 R 4,487,673
4,487,674
192 M 4,487,675
196 4,487,676
247 4,487,677
298 4,487,678
418 4,487,679
426 4,487,680
434 4,487,681

CLASS 206

43.31 4,487,311
158 4,487,312
205 4,487,313
216 4,487,314
334 4,487,315
443 4,487,316
509 4,487,317
554 4,487,318
602 4,487,319

CLASS 208

8 LE 4,487,682
8 R 4,487,683
10 4,487,684
44 4,487,685
48 R 4,487,686
56 4,487,687
310 Z 4,487,688

CLASS 209

3.1 4,487,320
510 4,487,321
526 4,487,322
546 4,487,323

CLASS 210

108 4,487,689
163 4,487,690
167 4,487,691
194 4,487,692
198.2 4,487,693
242.3 4,487,694
380.1 4,487,695
399 4,487,696
605 4,487,697
639 4,487,698
760 4,487,699
789 4,487,700

CLASS 215

253 4,487,324
307 4,487,325
4,487,326

CLASS 219

10.55 A 4,488,027
10.55 B 4,488,025
4,488,026
10.81 4,488,028
69 C 4,488,029
69 R 4,488,030
4,488,031
124.34 4,488,032
400 Re.31,765
522 4,488,033

CLASS 220

8 4,487,327
241 4,487,328
266 Re.31,759
276 4,487,329
324 4,487,330
405 4,487,331
445 4,487,332

CLASS 222

54 4,487,333
55 4,487,334
57 4,487,335
107 4,487,336
129.3 4,487,337
196 4,487,338
236 4,487,339
385 4,487,340
391 4,487,341
481.5 4,487,342

CLASS 223

85 4,487,343

CLASS 224

39 4,487,344
155 4,487,345
160 4,487,346
259 4,487,347
321 4,487,348
322 4,487,349

CLASS 225

2 4,487,350

CLASS 226

37 4,487,351
142 4,487,352

CLASS 227

9 4,487,353
67 4,487,354
112 4,487,355

CLASS 228

46 4,487,356
173 F 4,487,357

CLASS 229

27 4,487,358
39 R 4,487,359
73 4,487,360

CLASS 235

50 A 4,488,034
384 4,488,035
482 4,488,036

CLASS 236

11 4,487,361
12.2 4,487,362
49 4,487,363

CLASS 237

12.3 R 4,487,364

CLASS 239

8 4,487,365
11 4,487,366
112 4,487,367
229 4,487,368
488 4,487,369
687 4,487,370

CLASS 241

48 4,487,371
65 4,487,372

CLASS 242

16 4,487,373
18 A 4,487,374
55.3 4,487,375
55.54 4,487,376
56.8 4,487,377
68 4,487,378
107 4,487,379
4,487,381
107.3 4,487,380
197 4,487,382

CLASS 244

122 R 4,487,383
152 4,487,384

CLASS 246

122 R 4,487,385

CLASS 248

56 4,487,386
59 4,487,387
97 4,487,388
282 4,487,389
396 4,487,390
429 4,487,391

CLASS 250

204 4,488,037
211 J 4,488,038
216 4,488,039
227 4,488,040
231 GY 4,488,041
235 4,488,042
311 4,488,043
381 4,488,044
423 R 4,488,045
474.1 4,488,046
486.1 4,488,047
506.1 4,488,048
561 4,488,051
574 4,488,049
578 4,488,050
4,488,052

CLASS 251

121 4,487,392
328 4,487,393

CLASS 252

8.55 D 4,487,702
4,487,703
8.6 4,487,701
33.2 4,487,658
33.4 4,487,704
46.6 4,487,705
47 4,487,706
68 4,487,707
78.3 4,487,712
178 4,487,708
540 4,487,709
546 4,487,710
629 4,487,711

CLASS 254

28 4,487,394
134.3 R 4,487,395
327 4,487,396

CLASS 260

112 B 4,487,714
112.5 R 4,487,715
4,487,716
4,487,717
4,487,718
155 4,487,719
419 4,487,720
453 P 4,487,713
465 E 4,487,721
465 F 4,487,722
502 R 4,487,723
502.5 F 4,487,724
507 R 4,487,725
543 R 4,487,726

CLASS 261

94 4,487,727

CLASS 264

23 4,487,728
26 4,487,729
40.1 4,487,730
51 4,487,731
61 4,487,732
4,487,733
4,487,734
85 4,487,735
295 4,487,736

CLASS 266

44 4,487,397
120 4,487,398
158 4,487,399
193 4,487,400
234 4,487,401

CLASS 267

141.2 4,487,402

CLASS 269

2 4,487,403
15 4,487,404

CLASS 270

58 4,487,405

CLASS 271

127 4,487,406
233 4,487,407
4,487,408
267 4,487,409

CLASS 272

6 4,487,410
56.5 R 4,487,411
123 4,487,412
125 4,487,413

CLASS 273

113 4,487,415
115 4,487,417
129 V 4,487,416
242 4,487,418
343 4,487,419
371 4,487,414
423 4,487,420

CLASS 277

207 A 4,487,421

CLASS 280

154.5 R 4,487,422
279 4,487,423
289 G 4,487,424
432 4,487,425
609 4,487,426
615 4,487,427
644 Re.31,760
648 4,487,428
772 4,487,429

CLASS 281

29 4,487,430

CLASS 283

1 R 4,487,431

CLASS 285

15 4,487,432
81 4,487,433
93 4,487,434
94 4,487,435
114 4,487,444
228 4,487,436
319 4,487,437
349 4,487,438

CLASS 290

4 C 4,488,053
38 A 4,488,054
53 4,488,055

CLASS 292

251.5 4,487,439
336.3 4,487,440
4,487,441

CLASS 294

83 R 4,487,442
151 4,487,443

CLASS 296

65 R 4,487,445
106 4,487,446
108 4,487,447
146 4,487,448
216 4,487,449

CLASS 297

111 4,487,450
219 4,487,451
349 4,487,452
367 4,487,453
468 4,487,454

CLASS 301

37 AT 4,487,455
63 R 4,487,456

CLASS 307

10 AT 4,488,056
66 4,488,057
4,488,058
242 4,487,457
253 4,488,059
263 4,488,060
264 4,488,061
268 4,488,062
289 4,488,063
297 4,488,064
350 4,488,065
452 4,488,066
473 4,488,067
494 Re.31,766
570 4,488,068
577 4,487,458

CLASS 308

3 R 4,487,459

CLASS 310

49 A 4,488,069
62 4,488,070
68 B 4,488,071
71 4,488,072
83 4,488,073
93 4,488,074
156 4,488,075
171 4,488,076
212 4,488,077
242 4,488,078
260 4,488,079
328 4,488,080

CLASS 312

323 4,487,461

CLASS 313

141 4,488,081
318 4,488,082
366 4,488,083
506 4,488,084

CLASS 315

3 4,488,085
39 4,488,086
101 4,488,087
4,488,088
106 4,488,089
201 4,488,090
268 4,488,091
324 4,488,092
375 4,488,093

CLASS 318

16 4,488,094
38 4,488,095
328 4,488,096
443 4,488,097
561 4,488,098
4,488,099
798 4,488,100
800 4,488,101
810 4,488,102
811 4,488,103

CLASS 320

1 4,488,104
64 4,488,105

CLASS 323

239 4,488,106
340 4,488,107

CLASS 324

83 D 4,488,108
83 R 4,488,109
133 4,488,110
158 F 4,488,111
202 4,488,112
207 4,488,113
225 4,488,114
236 4,488,116
329 4,488,115
425 4,488,117
455 4,488,118

CLASS 329

50 4,488,119
122 4,488,120

CLASS 330

10 4,488,121
149 4,488,122

CLASS 331

2 4,488,123
107 DP 4,488,124

CLASS 333

1 4,488,125
18 4,488,126
142 4,488,127
4,488,128
165 4,488,129
203 4,488,130
205 4,488,131
229 4,488,132

CLASS 335

16 4,488,133

CLASS 336

58 4,488,134
62 4,488,135
215 4,488,136

CLASS 337

162 4,488,137
338 4,488,138

CLASS 339

14 R 4,487,462
17 C 4,487,463
19 4,487,464
30 4,487,465
32 M 4,487,466
49 R 4,487,467
75 MP 4,487,468
88 R 4,487,469
89 M 4,487,470
99 R 4,487,471
143 R 4,488,139

CLASS 340

57 4,488,140
97 4,488,141
347 DA 4,488,144
347 DD 4,488,142
4,488,143
384 E 4,488,145
407 4,488,146
636 4,488,147
700 4,488,148
762 4,488,149
781 4,488,150
825.5 4,488,151
870.37 4,488,152

CLASS 343

6.5 SS 4,488,153
9 R 4,488,154
376 4,488,155
754 4,488,156
771 4,488,157

CLASS 346

135.1 4,488,158
139 R 4,488,159
154 4,488,160

155 4,488,161

CLASS 350

3.71 4,487,472
6.8 4,487,473
96.21 4,487,474
4,487,475
162.13 4,487,476
172 4,487,477
335 4,487,480
345 4,487,481
429 4,487,482
444 4,487,483
449 4,487,484
459 4,487,485
525 4,487,486
615 4,487,479
622 4,487,478

CLASS 353

103 4,487,487
122 4,487,488

CLASS 354

62 4,487,489
115 4,487,490
203 4,487,491
234.1 4,487,492
4,487,493
401 4,487,494
403 4,487,495

CLASS 355

3 DD 4,487,496
8 4,487,497
14 R 4,487,498
14 SH 4,487,499
4,487,506
44 4,487,500
50 4,487,501

CLASS 356

125 4,487,502
136 4,487,503
323 4,487,504
400 4,487,505

CLASS 357

23 4,488,162
24 4,488,163
27 4,488,164
30 4,488,165
71 4,488,166
74 4,488,167

CLASS 358

10 4,488,168
22 4,488,169
26 4,488,170
76 4,488,171
107 4,488,172
4,488,173
136 4,488,174
4,488,175
141 4,488,176
158 4,488,177
163 4,488,178
181 4,488,179
183 4,488,180
220 4,488,181
310 4,488,182
319 4,488,183
342 4,488,184

CLASS 360

14.1 4,488,185
71 4,488,186
77 4,488,187
4,488,188
78 4,488,189
97 4,488,190
4,488,191
98 4,488,192
4,488,193
113 4,488,194
125 4,488,195
137 4,488,196
4,488,197

CLASS 361

20 4,488,198
93 4,488,199
104 4,488,200
334 4,488,201
386 4,488,202
433 4,488,203
4,488,204

CLASS 362

223 4,488,205
226 4,488,206
231 4,488,207
339 4,488,208
386 4,488,209

CLASS 363

19 4,488,210
45 4,488,211
54 4,488,212
58 4,488,213
71 4,488,214
159 4,488,215
160 4,488,216

CLASS 364

200 4,488,217
4,488,218
4,488,219
4,488,220
4,488,221
4,488,222
4,488,223
4,488,224
4,488,225
4,488,226
4,488,227
4,488,228
4,488,229
4,488,230
4,488,231
4,488,232
424 4,488,233
4,488,234
433 4,488,235
442 4,488,236
476 4,488,237
483 4,488,238
500 4,488,239
508 4,488,240
513 4,488,241
4,488,242
513.5 4,488,243
525 4,488,244
526 4,488,245
555 4,488,248
571 4,488,249
709 4,488,250
716 4,488,246
724 4,488,251
748 4,488,252
765 4,488,247
786 4,488,253
900 4,488,254
4,488,255
4,488,256
4,488,257
4,488,258
4,488,259

CLASS 365

49 4,488,260
104 4,488,261
4,488,262
189 4,488,263
4,488,264
4,488,265
4,488,266
201 4,488,267
203 4,488,268

CLASS 366

20 4,487,507
91 4,487,508
199 4,487,509
337 4,487,510

CLASS 367

73 4,488,270
151 4,488,271

CLASS 368

15 4,487,511
66 4,487,512
75 4,488,272
294 4,487,513

CLASS 369

11 4,488,273
24 4,488,274
44 4,488,275
46 4,488,276
48 4,488,277
50 4,488,278
54 4,488,279
77.2 4,488,280
126 4,488,281
135 4,488,282
4,488,283
147 4,488,284
170 4,488,285
292 4,488,286

CLASS 370

58 4,488,287
60 4,488,288
4,488,289
62 4,488,291
63 4,488,292
66 4,488,290
84 4,488,293
4,488,294
99 4,488,295
104 4,488,296

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1 4,488,297
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20 4,488,299
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CLASS 372

36 4,488,304
38 4,488,305
46 4,488,306
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58 4,488,310
87 4,488,309
89 4,488,311

CLASS 373

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CLASS 376

119 4,487,737
192 4,487,738
234 4,487,739
256 4,487,740
271 4,487,741
298 4,487,742

CLASS 384

113 4,487,514
620 4,487,460

CLASS 400

121 4,487,515
124 4,487,516
279 4,487,517
320 4,487,518
534 4,487,519

CLASS 402

65 4,487,520

CLASS 403

24 4,487,521
231 4,487,522
385 4,487,523

CLASS 405

50 4,487,524
184 4,487,525
196 4,487,526
211 4,487,527
259 4,487,528
261 4,487,529
282 4,487,530
291 4,487,531

CLASS 407

37 4,487,532
105 4,487,533
114 4,487,534

CLASS 409

60 4,487,535
239 4,487,536

CLASS 410

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CLASS 412

39 4,487,538

CLASS 413

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30 4,487,540
225 4,487,541
292 4,487,542
468 4,487,543
563 4,487,544
684 4,487,545
751 4,487,546
786 4,487,547

CLASS 415

28 4,487,548
30 4,487,549

CLASS 416

92 4,487,550
135 4,487,551

CLASS 417

64 4,487,552
171 4,487,553
241 4,487,554
312 4,487,555
417 4,487,556
420 4,487,557
477 4,487,558

CLASS 418

25 4,487,559
55 4,487,560
61 A 4,487,561
84 4,487,562
201 4,487,563

CLASS 420

459 4,487,743
584 4,487,744

CLASS 422

16 4,487,745
170 4,487,746

CLASS 423

60 4,487,747
240 4,487,748
309 4,487,749
321 R 4,487,750
474 4,487,751
507 4,487,752
555 4,487,784
573 R 4,487,753
574 R 4,487,754
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625 4,487,756

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7.1 4,487,757
21 4,487,758
32 4,487,759
70 4,487,760
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120 4,487,762
177 4,487,763
4,487,764
4,487,765
180 4,487,766
244 4,487,771
246 4,487,767
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4,487,769
249 4,487,770
250 4,487,772
4,487,773
256 4,487,774
266 4,487,775
269 4,487,776
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275 4,487,778
278 4,487,779
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317 4,487,782
322 4,487,783

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193 4,487,566
403 4,487,567
451.9 4,487,564
534 4,487,568
575 4,487,569

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265 4,487,800
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461 4,487,810
546 4,487,811
620 4,487,813
629 4,487,812

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100 4,487,820
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CLASS 430

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106.6 4,487,825
176 4,487,826
302 4,487,827
313 4,487,828

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331 4,487,572
348 4,487,573
359 4,487,574

CLASS 432

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241 4,487,579

CLASS 433

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88 4,487,582

CLASS 434

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259 4,487,585
408 4,487,586

CLASS 435

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135 4,487,832
172.2 4,487,833
173 4,487,834
317 4,487,835

CLASS 436

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27 4,487,837
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518 4,487,839

CLASS 440

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CLASS 441

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CLASS 445

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CLASS 446

147 4,487,590
220 4,486,975

CLASS 464

85 4,487,591
88 4,487,592
111 4,487,593
123 4,487,594

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CLASS 493

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221 4,487,597
450 4,487,598

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135 4,487,842

CLASS 502

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107 4,487,845
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223 4,487,848
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CLASS 518

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CLASS 521

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172 4,487,853
174 4,487,854

CLASS 523

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205 4,487,856
335 4,487,857
348 4,487,858
406 4,487,859
408 4,487,860
428 4,487,861
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512 4,487,863

CLASS 524

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29 4,487,865
42 4,487,866
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86 4,487,886
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24 4,487,925
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224 4,487,929
234 4,487,930

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285 4,487,932
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314 4,487,934
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304 4,487,938
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470		4,487,949	177		4,487,957	252		4,487,964	444	4,487,972	943	4,487,988		CLASS 604
472		4,487,950	204		4,487,958	454		4,487,965	454	4,487,973		CLASS 585	35	4,487,600
	CLASS 560		248		4,487,959			4,487,966	570	4,487,974	4	4,487,981	122	4,487,601
12		4,487,951	256		4,487,960	474		4,487,967	587	4,487,975		4,487,982	137	4,487,602
24		4,487,952		CLASS 562			CLASS 568		630	4,487,976	454	4,487,983	152	4,487,603
55		4,487,953	501		4,487,961	14		4,487,968	730	4,487,977		4,487,984	153	4,487,604
107		4,487,954	534		4,487,962	316		4,487,969		4,487,978	517	4,487,985	168	4,487,605
124		4,487,955	567		4,487,963	342		4,487,970	756	4,487,987			319	4,487,606
									816	4,487,979				

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D2—	208	276,664			276,680	D9—	370	276,697		158	276,712			276,728		28	276,744
	233	276,665		483	276,675		372	276,698			276,713	D16—	17	276,729			276,745
	244	276,666		510	276,682		403	276,699		192	276,715		46	276,730			276,746
	378.2	276,667	D7—	75	276,683		436	276,700		203	276,716		134	276,731		110	276,747
D3—	7	276,668		79	276,684		439	276,701		211	276,717	D19—	52	276,732		149	276,748
D6—	327	276,673		101	276,685		456	276,702	D13—	12	276,718		60	276,733	D26—	11	276,749
	335	276,669		151	276,686	D10—	15	276,703		99	276,719		91	276,734		73	276,750
	360	276,670		301	276,687		25	276,704	D14—	5	276,720	D20—	5	276,735	D28—	45	276,751
	369	276,671		332	276,688		40	276,705		53	276,692		17	276,736	D30—	99	276,752
	373	276,681		355	276,689		62	276,706			276,721	D21—	48	276,737	D34—	11	276,753
	380	276,672	D8—	14	276,690		98	276,707			276,722		65	276,738		20	276,754
	425	276,676		40	276,691		104	276,708		64	276,723			276,739		26	276,755
	446	276,674		61	276,693		106	276,709		107	276,724		86	276,740		33	276,756
	471	276,677		107	276,694	D12—	96	276,710		111	276,725		121	276,741		34	276,757
		276,678		320	276,695		110	276,714	D15—	9.2	276,726		129	276,742			276,758
		276,679		349	276,696		146	276,711		140	276,727	D23—	7	276,743			

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PATENTS

6 :	4,487,777	4,487,443	4,488,266	4,487,977	4,487,094	4,487,113
01 :	4,486,988	4,487,444	4,488,271	4,487,978	4,487,109	4,487,132
	4,487,476	4,487,446	4,488,275	11 : 4,486,908	4,487,135	4,487,296
	4,487,699	4,487,465	4,488,279	12 : 4,486,918	4,487,136	4,487,298
04 :	4,486,907	4,487,478	4,488,290	4,486,951	4,487,172	4,487,330
	4,487,399	4,487,490	4,488,297	4,486,966	4,487,183	4,487,370
	4,488,028	4,487,554	4,488,307	4,487,032	4,487,203	4,487,544
	4,488,090	4,487,580	08 : 4,486,943	4,487,320	4,487,244	4,487,592
	4,488,177	4,487,585	4,486,944	4,487,363	4,487,255	4,487,630
	4,488,188	4,487,590	4,486,969	4,487,558	4,487,291	4,487,773
	4,488,235	4,487,602	4,487,065	4,487,584	4,487,311	4,487,896
06 :	Re.31,765	4,487,638	4,487,194	4,487,588	4,487,324	4,487,917
	4,486,911	4,487,649	4,487,196	4,487,603	4,487,416	4,487,923
	4,486,925	4,487,653	4,487,346	4,487,605	4,487,445	4,487,930
	4,486,954	4,487,675	4,487,361	4,487,677	4,487,535	4,488,006
	4,486,964	4,487,676	4,487,365	4,487,707	4,487,541	4,488,136
	4,486,970	4,487,690	4,487,417	4,487,864	4,487,564	4,488,285
	4,486,997	4,487,704	4,487,462	4,488,000	4,487,598	19 : 4,487,076
	4,487,034	4,487,715	4,487,464	4,488,020	4,487,616	4,487,089
	4,487,054	4,487,724	4,488,004	4,488,024	4,487,619	4,487,119
	4,487,057	4,487,746	4,488,095	4,488,058	4,487,692	4,487,268
	4,487,061	4,487,794	4,488,218	4,488,067	4,487,753	4,487,269
	4,487,062	4,487,803	4,488,250	4,488,108	4,487,788	4,487,290
	4,487,068	4,487,813	4,488,294	4,488,118	4,487,804	4,487,411
	4,487,081	4,487,830	09 : 4,486,949	4,488,158	4,487,828	4,487,419
	4,487,085	4,487,922	4,487,016	13 : 4,486,926	4,487,832	4,488,140
	4,487,100	4,487,945	4,487,071	4,487,103	4,487,848	20 : 4,487,004
	4,487,120	4,487,989	4,487,191	4,487,140	4,487,868	4,487,007
	4,487,152	4,487,996	4,487,208	4,487,319	4,487,885	4,488,245
	4,487,162	4,488,001	4,487,252	4,487,336	4,487,921	21 : 4,487,394
	4,487,168	4,488,017	4,487,328	4,487,368	4,487,940	4,487,577
	4,487,176	4,488,040	4,487,355	4,487,631	4,487,941	4,487,948
	4,487,179	4,488,046	4,487,358	4,487,641	4,487,980	22 : 4,486,909
	4,487,226	4,488,051	4,487,379	4,487,816	4,487,983	4,487,095
	4,487,227	4,488,053	4,487,431	4,488,274	4,487,984	4,487,259
	4,487,251	4,488,055	4,487,477	15 : 4,487,359	4,488,034	4,487,294
	4,487,256	4,488,060	4,487,487	4,487,455	4,488,044	4,487,643
	4,487,265	4,488,063	4,487,488	16 : 4,486,979	4,488,101	4,487,722
	4,487,307	4,488,076	4,487,548	4,487,736	4,488,110	4,487,750
	4,487,316	4,488,099	4,487,636	17 : Re.31,761	4,488,147	4,487,831
	4,487,333	4,488,130	4,487,683	Re.31,762	4,488,198	4,487,873
	4,487,340	4,488,148	4,487,799	4,486,917	4,488,201	4,487,891
	4,487,344	4,488,155	4,487,845	4,486,929	4,488,209	4,488,011
	4,487,345	4,488,156	4,488,236	4,486,930	4,488,288	23 : 4,487,666
	4,487,366	4,488,165	4,488,270	4,486,939	4,488,289	24 : 4,486,904
	4,487,383	4,488,166	4,488,287	4,486,941	18 : Re.31,766	4,487,067
	4,487,387	4,488,187	10 : 4,487,668	4,486,971	4,486,928	4,487,102
	4,487,403	4,488,192	4,487,792	4,486,975	4,486,947	4,487,149
	4,487,404	4,488,193	4,487,856	4,486,977	4,486,986	4,487,224
	4,487,413	4,488,208	4,487,878	4,487,003	4,486,993	4,487,278
	4,487,429	4,488,232	4,487,901	4,487,013	4,487,022	4,487,293
	4,487,439	4,488,240	4,487,902	4,487,027	4,487,063	4,487,329
	4,487,440	4,488,263	4,487,916	4,487,088	4,487,105	4,487,504

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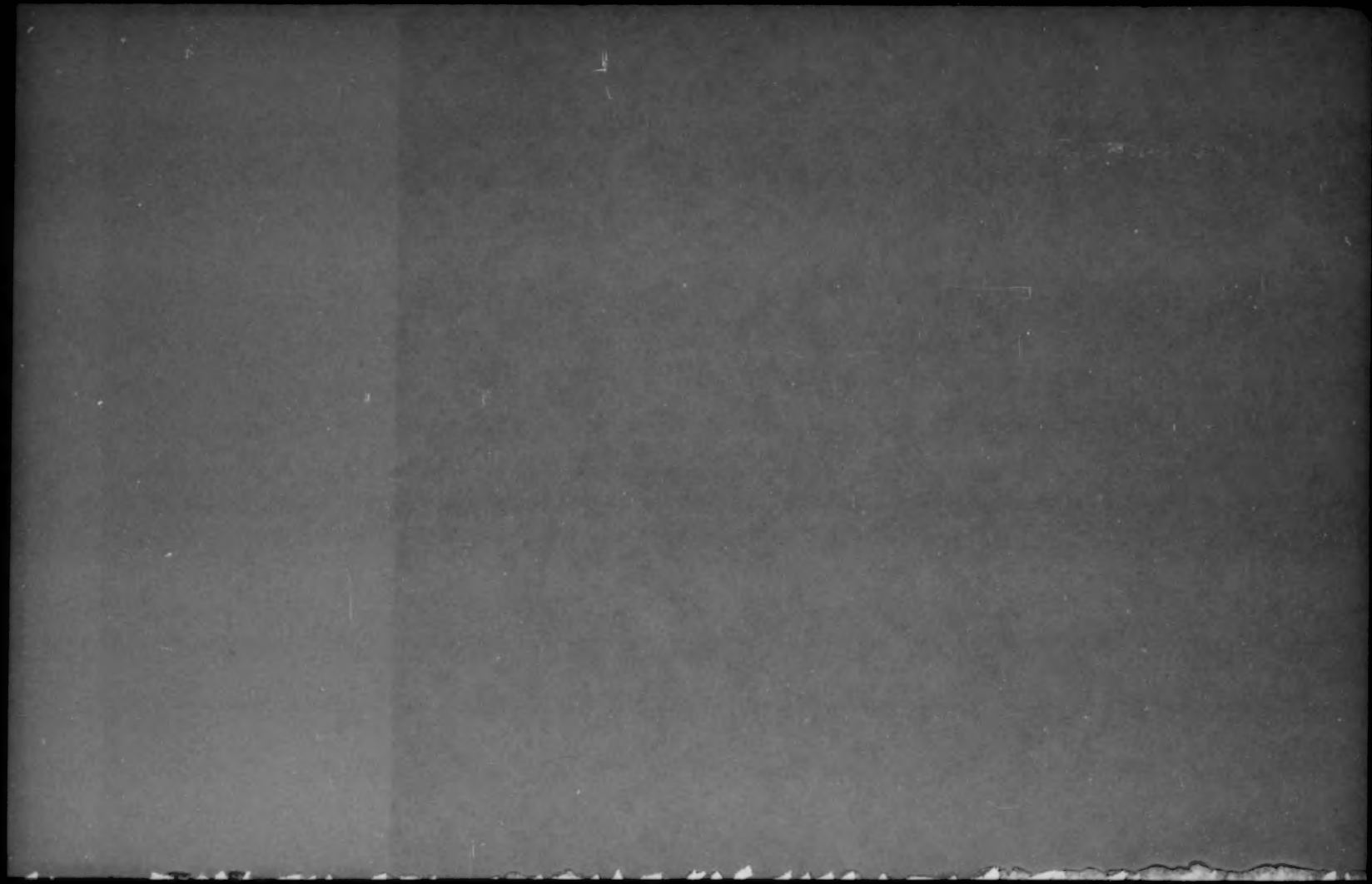
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